August, 1942
25 Cents

Southern Flight

Aero.

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Division of Aeronautics

Here Come THE CORSAIRS

High-powered Vought Corsairs are rolling off production lines for the United States Navy.

With their 2,000-horsepower air-cooled engines, these mighty shipboard fighters pack the firepower, range, climb and speed at all altitudes to take the measure of the best the enemy can produce.

VOUGHT-SIKORSKY AIRCRAFT
STRATFORD, CONNECTICUT
One of the three divisions of
UNITED AIRCRAFT CORPORATION

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AUG 15 1942

CAPTAIN RUDY TRUESDALE, veteran T.W.A. million miler, who flies the sunny Sante-Fe Sky Trail from Kansas City to Albuquerque, makes a business forecast for the future.

"Before Long, Sales and Salesmen Will Be *Going Up* Together... in the Family Car of the Air"

"MARK MY WORDS," says Captain Truesdale, *"big things are going to happen* in this country after the war. Industry will be producing, and people will be buying, as they never have before.

"You'll be back on the old selling job again, covering your territory in your own Family Car of the Air in one-third the time it takes in a car. And your sales will *go up* because you'll be *going right up* after them. Hard to believe? I'd have said so too if I didn't know the planning that's being done at Cessna in Wichita. But now I know that *flying for everyone* is here, ready to be offered as soon as this war's over."

Anyone who can drive an automobile can fly the Family Car of the Air. The salesman can use it to cover all the small towns the airlines don't reach. And his wife can use it for 200 mile shopping trips as naturally as she drives downtown today. As Captain Truesdale says, it's hard to believe until you realize that these predictions are soundly based on Cessna's 31 years of aviation engineering and manufacturing background. In addition, Cessna's all-out wartime production of Bobcats and Cranes, to help win this war once and for all, is crowding years of progress into weeks today at Cessna.

We're Wearing War Paint Now

Yes, for the past year and a half Cessnas have been wearing the war paint of the U.S. Army Air Corps or the British Empire Joint Training Program. And they're going to wear that war paint proudly until victory is won.

These twin-engined Cessnas are flying over four million miles a week in bomber-pilot training service. And just as these Cessnas are helping to win the war today, so will the future Cessna Family Car of the Air help to win the peace that follows.

KEEP 'EM FLYING — CESSNA

FREE
"Keep 'Em Flying Wings"

Wear your wings and help to "Keep 'Em Flying." Every pair is a *headache for Hitler and Hirohito* because you get them free with a Jap Hunting License when you send 10 cents for a U. S. Savings Stamp to...

THE CESSNA AIRCRAFT COMPANY
Dept. SF, Box 1616, Wichita, Kansas

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Cessna

SYMBOL OF *Aircraftsmanship* FOR THIRTY-ONE YEARS

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HAULING THE BIG LOADS ALOFT

You will see it soon—air transport on a tonnage basis. The world will use it . . . as we now use the airmail. And the bigger ships that are on the way will rely on power by Wright.

WRIGHT *Aircraft Engines*

Southern Flight

The only complete monthly digest of aeronautics in the South and Southwest

AUGUST, 1942. VOL. XVIII, NO. 2

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REVVING UP

Helicopter Proved Practical

Take Igor Sikorsky's word for it that the fundamental problems of control and stability of rotary-wing aircraft appear to have been solved. After testing his VS-300 helicopter, the pioneer said it takes off without ground run, rises and descends vertically, hovers over one spot for any desired time and can be flown backwards and sideways as well as forward.

Morale—with Teeth in it

We've never yet seen a suitable definition for morale. The best description, however, comes from Captain E. E. Tiedt, an Air Force chaplain at Miami Beach who was there when the December 7 bombs struck Pearl Harbor. Near him was a private whose false teeth, jarred loose by bomb concussion, flew to the ground. Unmindful of the rain of bombs, the private calmly began searching amid the shrapnel until a nearby buddy yelled out: "Never mind your teeth right now, Mac. Them ain't sandwiches they're dropping!"

Along the Yukon

Air cargo and passenger volume in the Far North is increasing tremendously, with the old weekly schedules replaced by daily operations over 11,000 miles of airways covered by 105 airplanes of the Canadian Pacific Air Lines, Ltd. That's the picture given by G. W. G. McConachie of Edmonton, founder of the Yukon Southern Airways and general manager of western operations for CPAL. He was a recent visitor to Texas and told us about events up North while conferring with Don Marshall of Lockheed's Dallas branch. McConachie's planes haul many items to and from mining centers and other operations in the Arctic, including radium-bearing pitch blende, at a rate of $1 per pound per thousand miles, with a minimum load of 3,000 pounds required. But though business is booming, all pilots have standing orders to land and lend a helping hand whenever they see a signal of distress in the back country, where trappers and miners have only to lay out in block letters the words "Stop" or "Help" for emergency air service.

McConachie hadn't been in town two days before another veteran of the frozen wastes dropped in on us—Jim Dodson, who operates "anywhere, anytime" out of Fairbanks. With him was his pretty wife and they visited Eddie Jackson, treasurer of Globe Aircraft Company at Ft. Worth. Jim, who opened his airway twelve years ago, said his wife was in on his most unusual experience over the wilds. They were flying an expectant mother into civilization when the stork caught up with the ship. Six thousand feet above the frozen hills the baby was born. "What," asked Jim, "would I have done if my wife hadn't been up there with me?"

Observation

In the **Beechcrafter is a regular** column headed: PRODIGAL SONS OF BEECH.

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Daily, Including Sunday

Lisbon, Balboa, New York, Natal, Honolulu, San Francisco . . . these are way stations on the aerial trade routes of the world.

Daily, including Sunday, in winter and summer, in war and peace, giant Boeing flying boats shuttle to and fro across the world in the service of far-flung American and British airways. From the beginning, three years ago, of regular flight schedules between this country and Europe, the transatlantic service has been maintained almost entirely by airplanes designed and built by Boeing.

Today, *when time itself is flying*, men, messages and vital materials of war are dispatched by Clipper to key points in the strategic battle formation of the United Nations. Such important figures as Winston Churchill have recently crossed the Atlantic in Boeing planes. Since December 7, more than 600 major overseas flight assignments have been completed "without accident or incident" by Boeing-built Pan American Clippers, largest of all ships in commercial service.

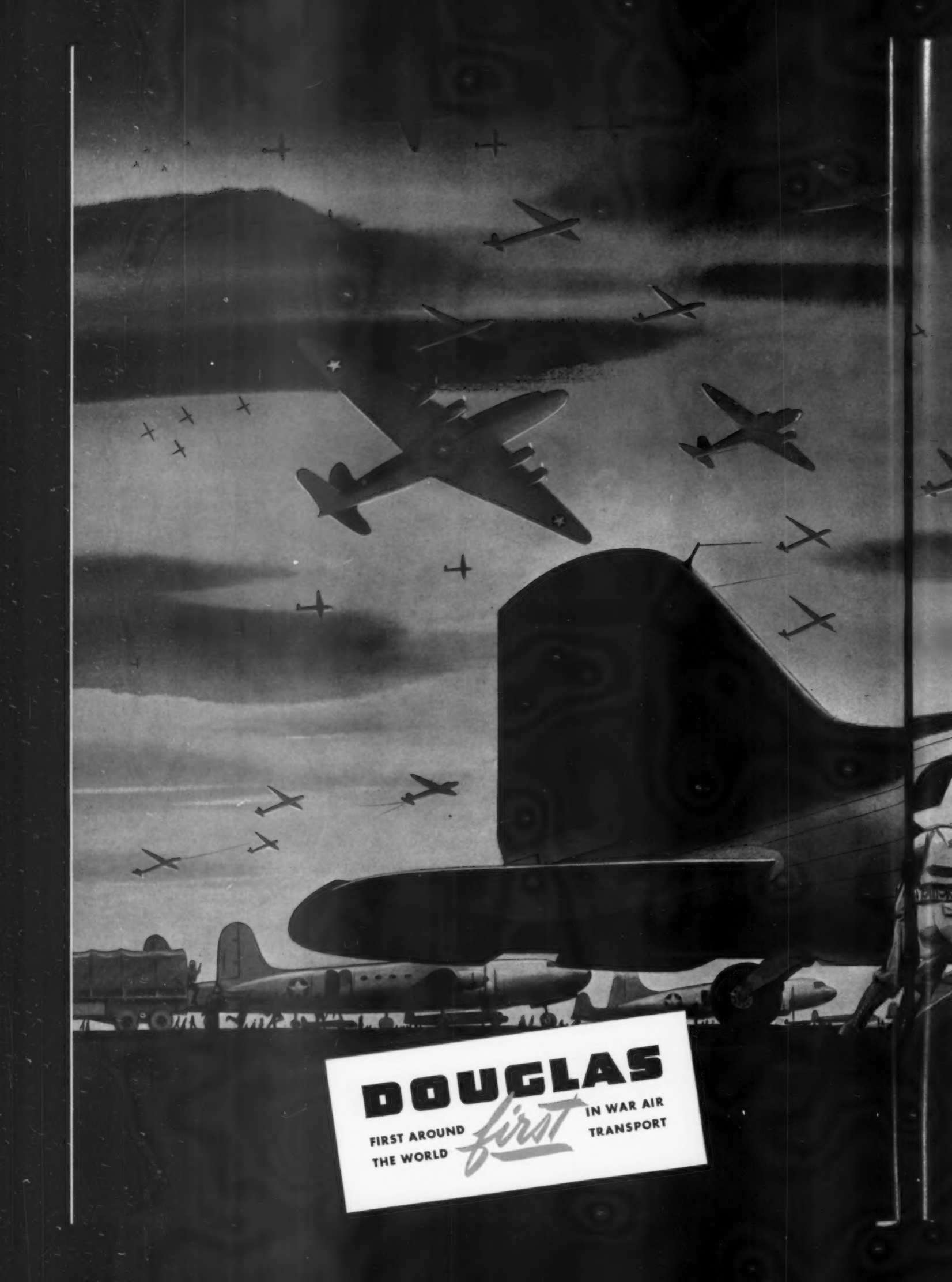
The construction of a huge trans-oceanic Clipper, complete with galleys, berths, lavatories, baggage rooms, crew compartments and control cabins, requires aeronautical engineering of the highest calibre. . . . It also requires skill in acoustical, chemical, mechanical, radio, structural, electrical, heating, ventilating, seating, sanitary, civil and many other kinds of engineering.

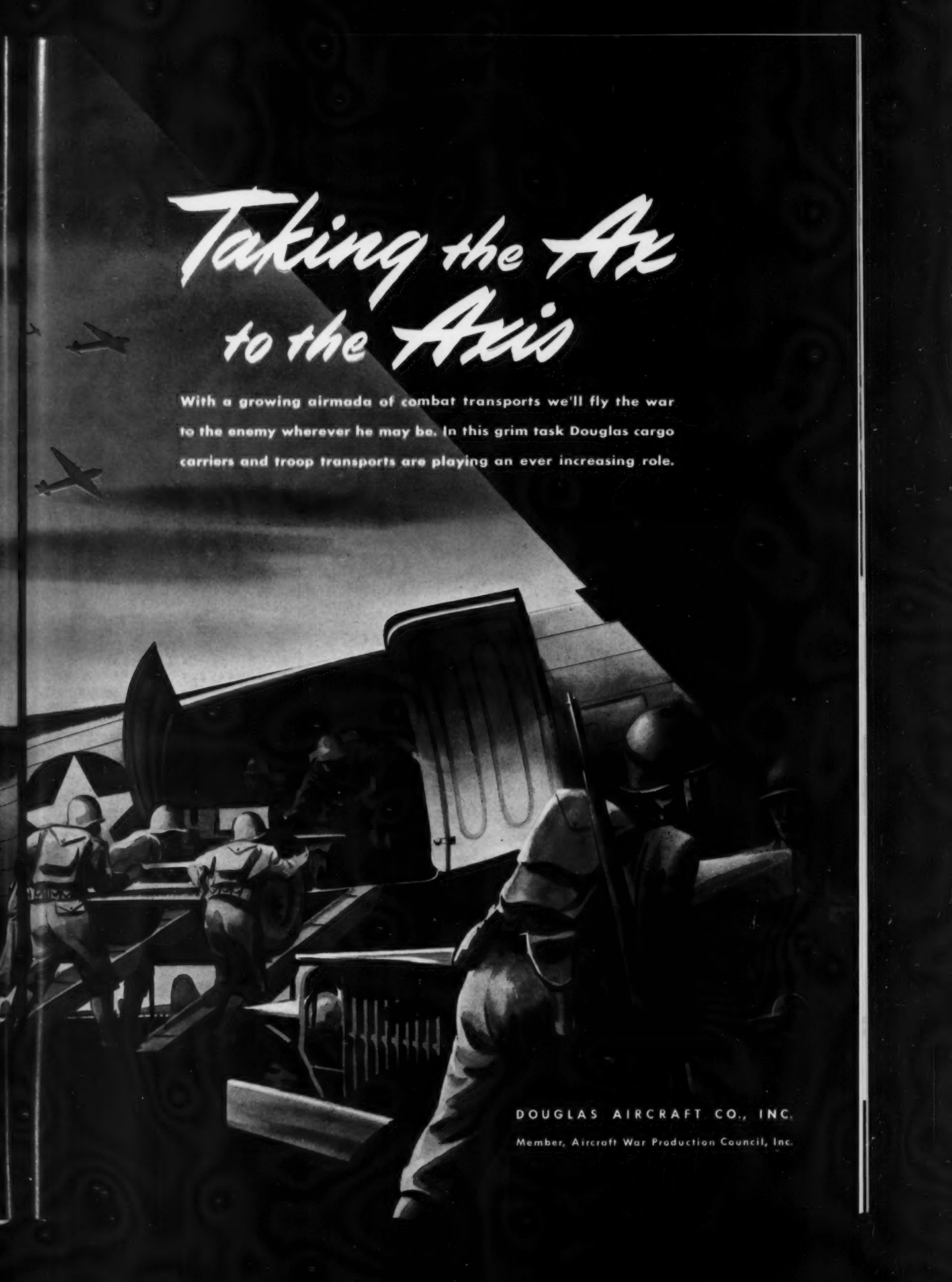
Today the diversified Boeing engineering which produced the Boeing flying boat is concentrated on the designing of Flying Fortresses,* trainers, gliders and other military aircraft for our armed forces. When the work of these war planes is done, these same skills will be turned once more to peacetime tasks, creating products which serve you well.

Variety in engineering skills . . . integrity in engineering design . . . efficiency in production . . . long experience in research . . . these are the qualities which are built into things built by Boeing.

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS **BOEING**

*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS


DOUGLAS
FIRST AROUND THE WORLD
first
IN WAR AIR TRANSPORT


Taking the Ax to the Axis
With a growing airmada of combat transports we'll fly the war to the enemy wherever he may be. In this grim task Douglas cargo carriers and troop transports are playing an ever increasing role.
DOUGLAS AIRCRAFT CO., INC.
Member, Aircraft War Production Council, Inc.

The Birdmen's Perch

THE NAMES ARE STILL rolling in for our Oily Boid.

In case you came late—the animated feather duster hopped into the page last month and refused to go away. We gave him a temporary name of "Oily Boid" and asked the Perch Pilots for a better one. We've gotten some daisies, too.

Lubrilark . . .
Strato Sam . . .
Perchawk . . .
Taxi . . .

Tell you what: we'll give an original drawing of the greaseduck to the lad who gives him the best name.

We mean you Perch Pilots on foreign soil, too. Because if you send a better name than the one we pick, any time within the next six months, we'll rename the gashawk and send YOU a drawing. O. K.?

Major Al Williams

alias, "Tattered Wing Tips," Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh, Pa.

BRAINTWISTER

Two plane-owners planned a 720 mile XC trip. Because of engine trouble, one was unable to get off until the other was ¼ of the way to their destination. The late starter used G. A. G., however, and was able to fly 4 miles to every mile of the other pilot. Who got there first? *You* ask and *we'll* answer.

ALLY FORGE

A plane-engine maker is now forging cylinder heads, instead of casting them.

Forging eliminates up to 3½ lbs. of unnecessary weight per cylinder. And each remaining pound of the "cleaned-up" head does an improved, more efficient job, increasing engine hp. output up to 15%.

This forging technique for making cylinder heads might be compared to Gulf's Alchlor technique for making Gulfpride. Both improve over old methods.

Gulf's special Alchlor Process removes "unnecessary weight" in the form of carbon-makers and sludge-formers. Then the remaining "cleaned-up" Gulfpride does an improved, more efficient job of lubricating your engine, increasing its performance.

WHOPPER

Dear Major:

Don't put this in the Whopper column—it's true!

This sad tale concerns our late friend, Pilot Officer Elmer Quirk, of Faroff, Tex. It was pieced together from bits of evidence found along the New Brunswick coast, and the undamaged film from his camera gun.

Elmer had just refueled his Howard Mark II (Gulf Aviation Gas, of course) and was on operational training over an undisclosed eastern seaboard city. He must have cracked his throttle and gone into a tight turn. Halfway through the turn, P/O Quirk saw what he thought was the yellow tail of a Jap aircraft. He let go with all guns (one) and watched the yellow tail disintegrate.

While we normally cruise at 150 on ⅛ throttle (using G. A. G.) Elmer must have far exceeded the makers recommendations when he cracked the throttle. Possibly even ½ throttle! The Wasp gave a mighty roar, turned tighter, and poor Elmer shot off his own tail!

L. A. C. Blanchfield H.
L. A. C. Johnson J. F.
#8 S. F. T. S.
Moncton, N. B., Canada

Gulf Oil Corporation and Gulf Refining Company... makers of

GULF AVIATION PRODUCTS

OIL IS AMMUNITION—USE IS WISELY!

NEVER COUNT ON TAIL WINDS ON XC TRIPS. MAKE ALLOWANCES FOR WIND AND HEAD WIND CONDITIONS.
IN CALCULATING FUEL RESERVES, SPACE REFUELING POINTS SO THAT THERE WILL ALWAYS BE —
G.A.G.
G.A.G.
G.A.G.
—A 25% RESERVE IN YOUR TANK WHEN YOU LAND. THAT PROVIDES A SAFE MARGIN AND STILL—
—LEAVES ROOM FOR ¾ OF A TANKFUL OF GULF AVIATION GASOLINE
LF

Not on Battle Fronts—but Training and Coastal Fronts—Cadets have proved their mettle

Greater Cadets train better pilots for a more powerful Air Force—carry sharp eyes along far-reaching coastal fronts—render valuable aid in the Liaison Service of the CAP.

We are proud that peace-time Cadets are recognized for their ability to fulfill a war-time job—that they are performing that job with the economical efficiency and rugged stamina that has earned for them the reputation of *America's Finest Primary Trainers.*

Your part in the CPTP and the CAP will be even greater when you fly 65 HP and 90 HP Interstate Cadets—*the Civilian Trainers built to Military Precision.* Write today for complete information.

TWO PLANTS TO SERVE YOU

INTERSTATE

Cadet

GREATER BOMB LOADS FOR WAR

PAY LOADS FOR PEACE

The aviation industry was built on peace. But a man named Schicklgruber changed all that.

Today American aviation is winning the Battle of Bomb Loads, of Fire Power and Performance. And from these achievements will come both victory and a new aviation industry with new conceptions of speed, of range, of load, of lift.

Pioneers in planning and production, the Men of Northrop build planes for today, planes whose greater bomb loads will help win the war and whose greater pay loads will help win the peace.

Watch Northrop

NORTHROP AIRCRAFT INC., HAWTHORNE, CALIFORNIA

MEMBER AIRCRAFT WAR PRODUCTION COUNCIL, INC.

"SNUB NOSE"... In this war it takes heft to win. The massive visage of the *Republic P-47 Thunderbolt* is a symbol of fighting brawn and rocket speed . . . of terror to Nazi and Jap . . . Republic Aviation Corporation, Farmingdale, Long Island, New York.

REPUBLIC AVIATION

REPUBLIC AVIATION

BOLTS
via manufactured lightning

The Grumman "Avenger"—newest of carrier based torpedo planes—attacks at high speed and low altitude, releasing a full-sized torpedo from a streamlined bomb bay. When our fighting crews attacked the Japs with Avengers BENDIX-SCINTILLA Magnetos flew with them as members of "The Invisible Crew". Through the full range of engine speeds, at all altitudes from take-off to ceiling, BENDIX-SCINTILLA Aircraft Magnetos, Spark Plugs and Ignition Switches deliver manufactured lightning, timed to the hundredth of a second. They're vital electrical members of "The Invisible Crew"—the Bendix-built precision instruments and controls made by 15 Bendix Divisions.

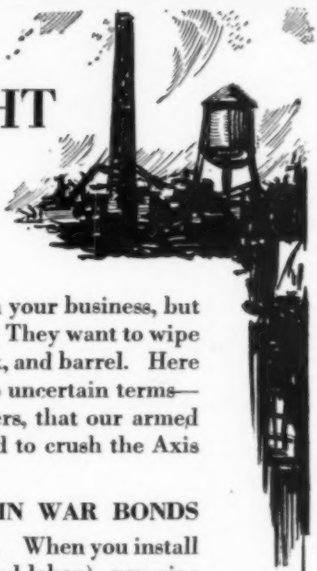
THE INVISIBLE CREW Bendix

AVIATION CORPORATION SCINTILLA MAGNETO DIVISION

BENDIX SCINTILLA THE WORLD'S FINEST AIRCRAFT IGNITION

TARGET FOR TONIGHT

. . . Your Business?



Maybe they won't actually come and drop a *bomb* on your business, but the Axis war lords have their eye on it, just the same. They want to wipe it out as a competitive force—or take it over lock, stock, and barrel. Here is a threat that you can reply to *now*, today, and in no uncertain terms—by buying War Bonds to the very limit of your powers, that our armed forces may have the guns, tanks, and planes they need to crush the Axis *once and for all.*

THE GOAL: 10% OF EVERYONE'S INCOME IN WAR BONDS

Every American wants the chance to help win this war. When you install the Pay-Roll War Savings Plan (approved by organized labor), you give your employees that chance. For details of the plan, which provides for the systematic purchase of War Bonds by voluntary pay-roll allotments, write: Treasury Department, Section S, 709 12th St. NW., Washington, D. C.

EVERYBODY EVERY PAYDAY 10%

Buy War Savings Bonds

This space is a contribution to America's All-Out War Program by

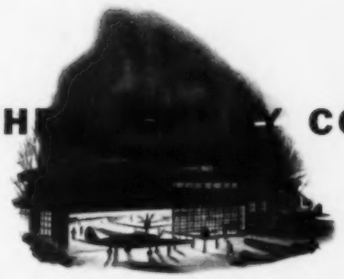
SOUTHERN FLIGHT

U. S. GOVERNMENT PRINTING OFFICE 16—28443-1

Form No. WSS-BP-200

Night Landing of Cannon-Bearing Airacobra

...WH[illegible] COMES **Flying** HOME



Above the clouds, through the screaming sounds of a night attack, comes the staccato bark of guns. A cannon's cough pierces the rhythmic whine of screaming motors. There's a flash of flame.

Then, Johnny Comes Flying Home.

Those few seconds flash back seven years to the start of the fighter plane that has since captured the imagination of men, everywhere. It's the story of blood, sweat, toil and tears through the years when Axis danger seemed a fairy story.

Johnny is flying a heavily armed Army Airacobra. It's generally considered the most deadly fighter plane on wings. With speed, fire power and maneuverability on his side—with motor aft and guns out front—a cannon firing through the nose—the odds are with Johnny. Much of Aviation's finest skill has been busy for years giving Johnny those odds.

And it's never too early to say that we are looking forward to the day when Johnny will really come flying home, to find his place in a new world of peacetime aviation.

Stepped up by the needs of war, we know America will have the benefits of the mass production of planes to carry on its commerce and travel in the skies.

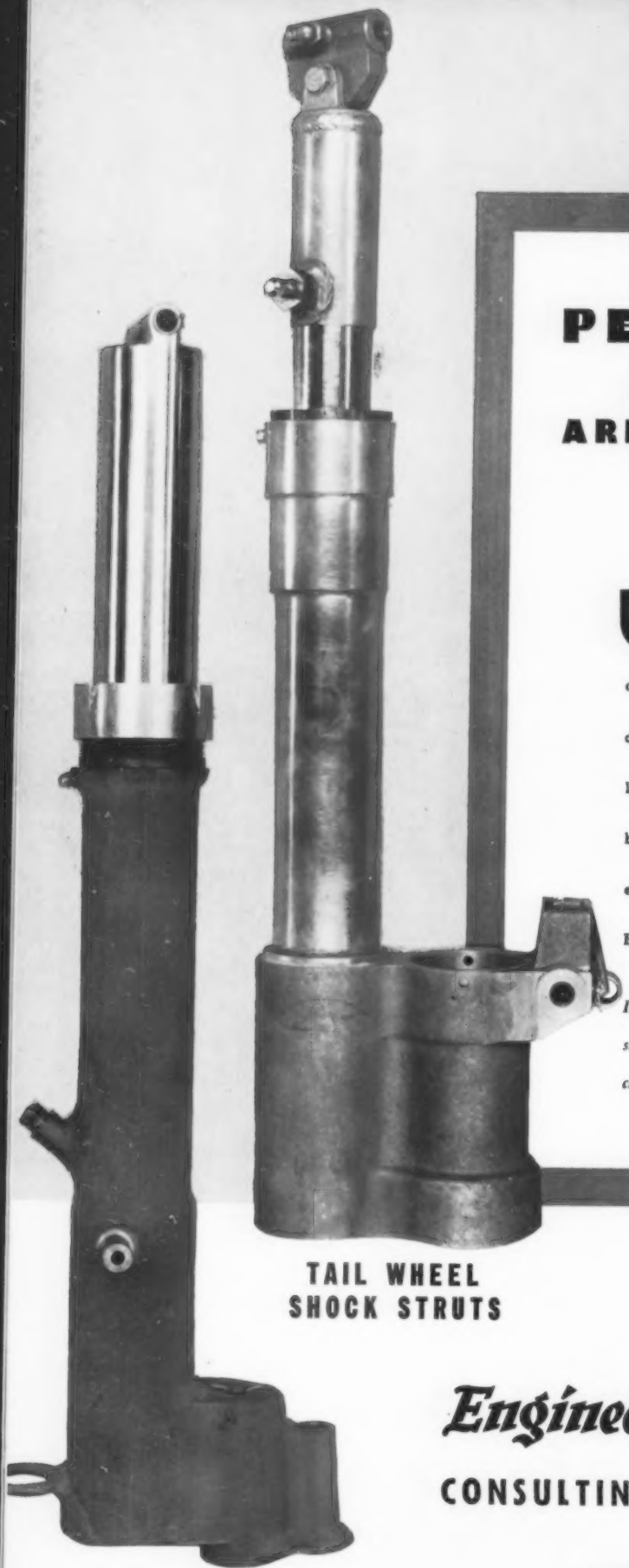
But Johnny must have those future planes of peace... and when the time comes, we at Bell Aircraft will be doing our part not to let Johnny down. © Bell Aircraft Corporation, Buffalo, New York.

Airacobras for victory—

FUTURE PLANES FOR PEACE

BELL *Aircraft*

PACEMAKER OF AVIATION PROGRESS



TAIL WHEEL
SHOCK STRUTS

PERFECT LANDINGS ARE *Precision Built* AT E.L.I.

UPON perfect landings EVERY TIME depends the safety of airplane and crew. Yet under war conditions landing fields very often are far from ideal. A tremendous responsibility rests on the landing gear and shock struts. Precision manufacturing has been a basic habit at E.L.I. for a good many years and all our resources in equipment and skill are going into the many aviation products E.L.I. is building to help the United Nations finish the job!

Illustrated are shown two types of welded fabricated tail wheel struts built by E. L. I. Tolerances of .001 of an inch. Plungers hard chromium plated. All welding done by Army—Navy certified welders.

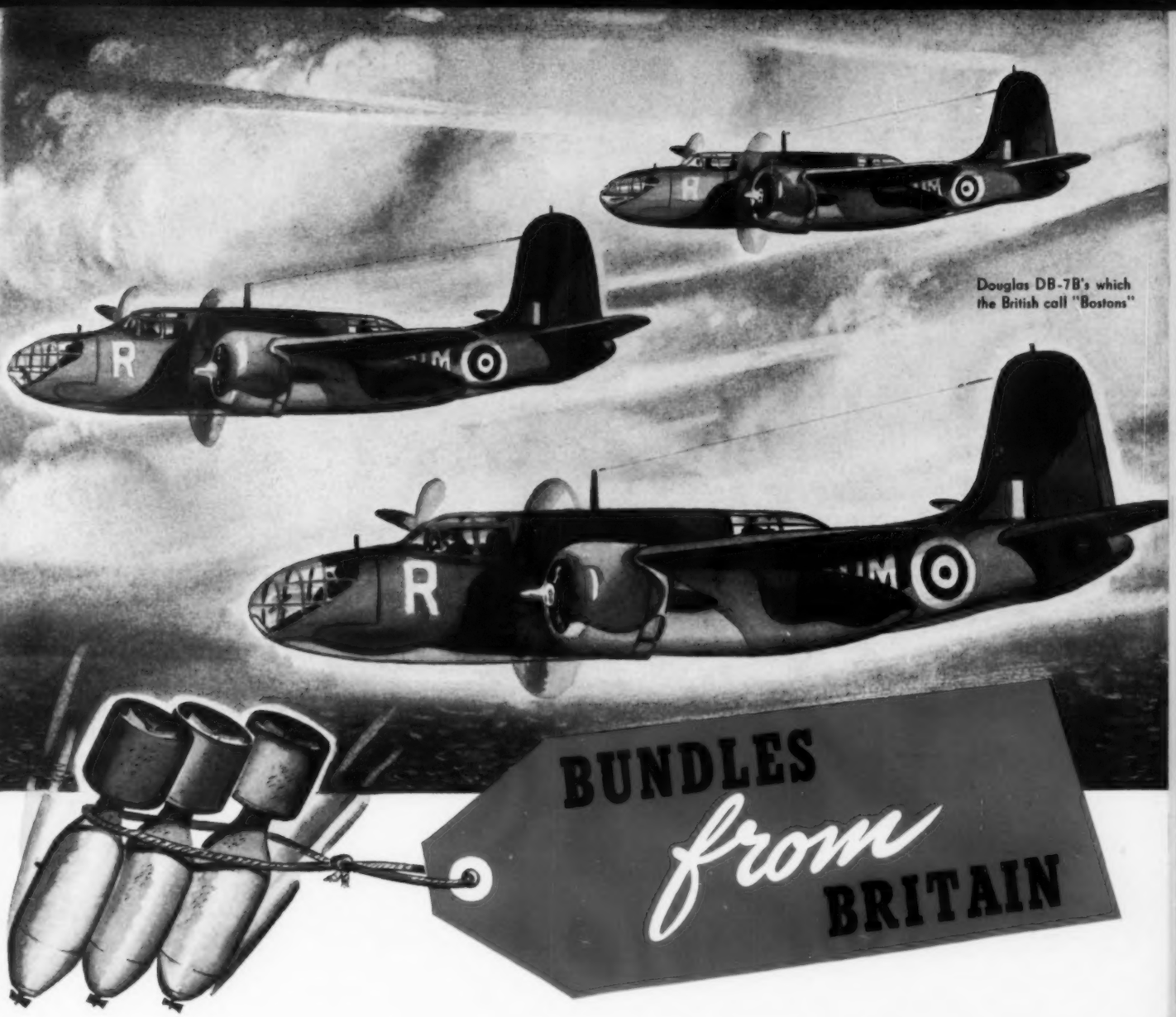
Engineering Laboratories, Inc.

CONSULTING ENGINEERS & MANUFACTURERS

TULSA, OKLAHOMA, U. S. A.

EQUIPMENT IN WORLD-WIDE USE

Throughout the past eleven years, E. L. I. as one of the largest geophysical research organizations in the World has contributed many instruments and developed services vital to the Petroleum Industry.



Douglas DB-7B's which the British call "Bostons"

THESE "bundles" are being donated by the R. A. F., and their highly explosive nature is making life pretty miserable for Schicklgruber and Company. ¶The Boston bombers illustrated, together with many other American made planes used by the Royal Air Force in their devastating attacks on the Nazis, are equipped with Aerols.* ¶It is perfectly natural that Aerols are extensively used on planes being flown by our allies. For Aerols were the *first* hydraulic-pneumatic shock absorbing units, the type now almost universally used in modern aviation. As a result, Aerols have been used on more planes than any other type made. They help to insure safe, smooth landings and take-offs on the fiercest fighters and the biggest bombers. ¶The many years of engineering experience, unmatched testing equipment, and huge production facilities that have given Aerols this enviable leadership, are now devoted to just one job — *helping the United Nations overwhelm the forces of evil.*

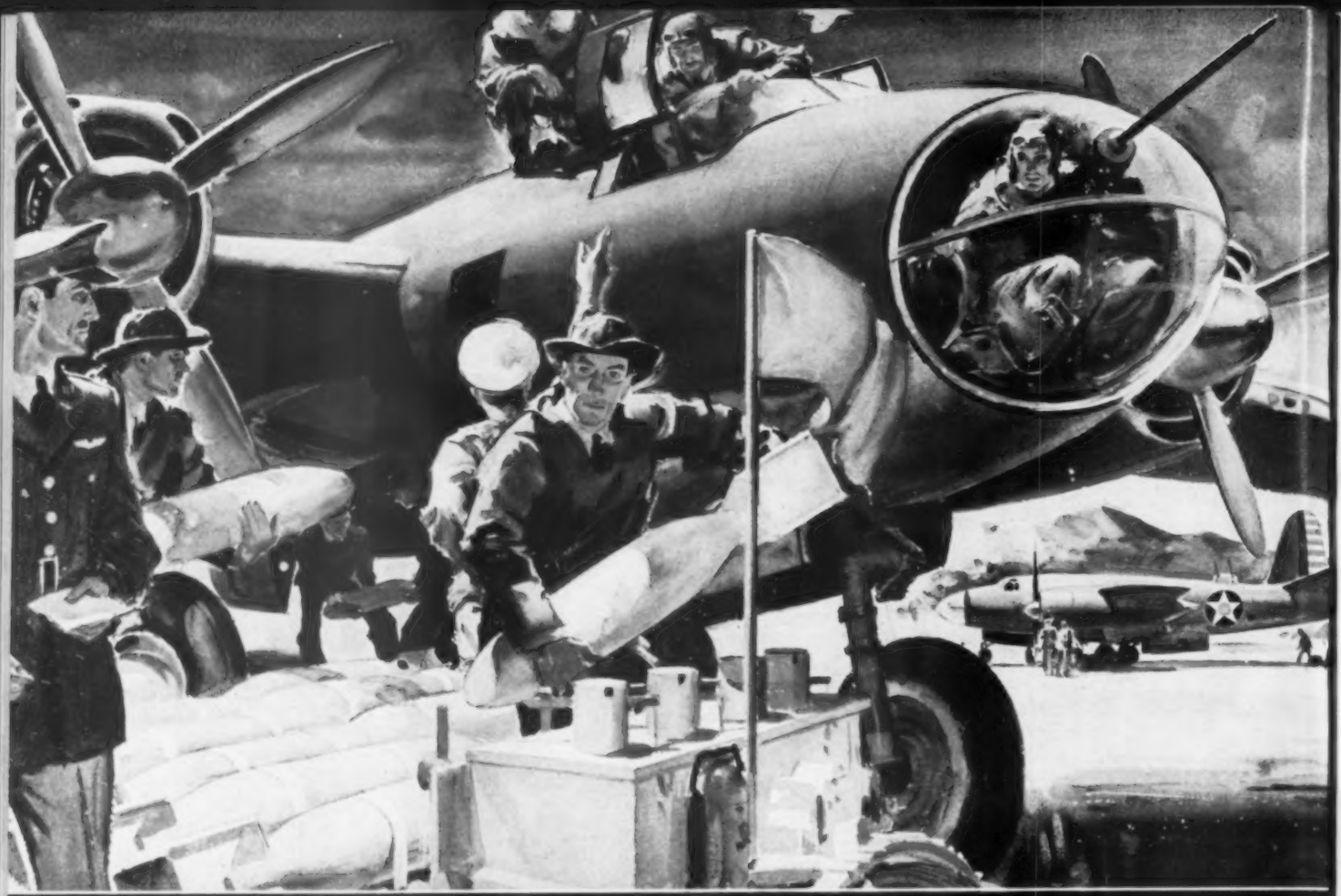
THE CLEVELAND PNEUMATIC TOOL COMPANY
AIRCRAFT DIVISION • CLEVELAND, OHIO

CONTRACTORS TO THE UNITED STATES GOVERNMENT

Also manufacturers of Cleco pneumatic tools for the aircraft industry, Cleco sheetholders, Cle-Air shock absorbers for trucks and buses, and rock drills for mining and construction work.

AEROLS*

* THE SHOCK ABSORBING UNITS ON AN AIRPLANE'S LANDING GEAR; THE NAME IS DERIVED FROM THE WORDS "AIR" AND "OIL"—THE FLUIDS USED TO DISSIPATE THE LANDING SHOCKS.



Precision Pays by giving America the world's best aircraft. Martin bombers have proven their high fighting qualities on many far-flung battle fronts. Performance of Martin bombers around the globe is a tribute to the care and vigilance of Martin workers.

Martin B-26 Bomber

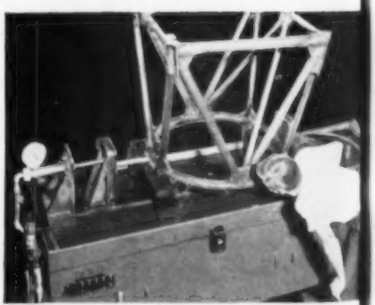
Over 2000 Martin Inspectors Can't be Wrong!

INSIDE STUFF: Under X-rays, flaws, blow-holes, porosity, slag inclusion, or other imperfections in aluminum castings and forgings are immediately apparent.

PRECISION is today's prelude to battle. The skill of the men who fly is wasted without the skill of the men who build. One flaw, perhaps invisible to even the trained eye, may cost America thousands of man-hours worth of equipment. One moment of carelessness or inattention may cost America a victory. Over two thousand Martin inspectors can't be wrong!

In Martin plants you find every possible device to insure accuracy. But the dependability of Martin Aircraft rests upon the eyes, brains and hands of the inspectors who use this equipment. More than keen vigilance is demanded of these men and women. They must have determination as strong as the aircraft they build . . . determination to remain alert every second . . . determination to give the men on the fighting fronts weapons second to none.

Born of such determination, painstaking care and unerring accuracy have made Martin Aircraft world-known for dependability since 1909. The Glenn L. Martin Company, Baltimore, Maryland, U. S. A.



EAGLE EYE of magnaflux detects minute flaws in steel otherwise invisible unless magnified 50 times. How? Iron filings in oil show magnetic patterns around cracks.

PREENING TAIL FEATHERS: Control surfaces must be set precisely in relation to the fuselage. Inspectors use a special tool to verify the angle of incidence.

Martin
AIRCRAFT

Builders of Dependable Aircraft Since 1909

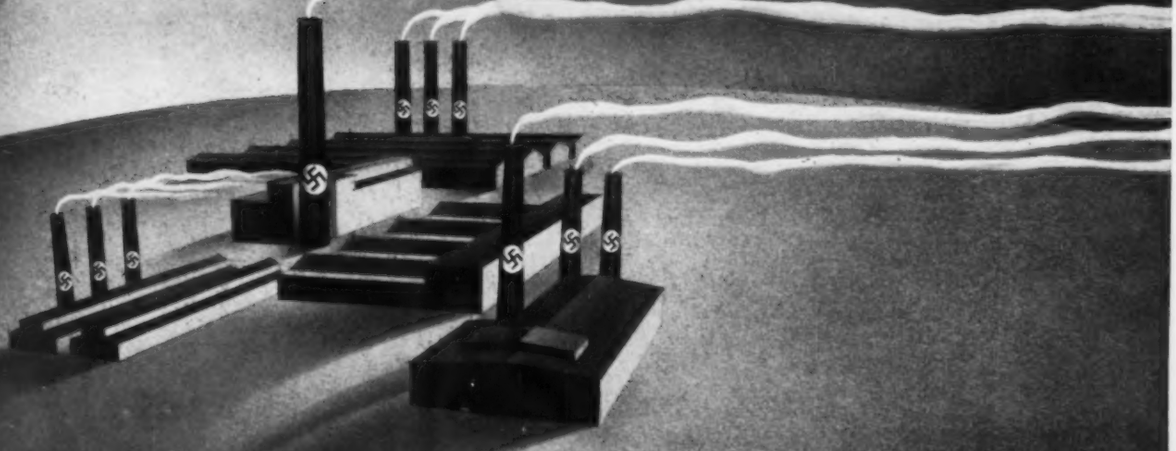
TELL-TALE: Inaccuracies in dimensional tolerances get the gong from this Martin inspector. Holes in casting cannot vary by as much as the thickness of this page.

FOR NAVIGATORS who must get the DRIFT · · · *fast*

Contrary winds can do a lot of blowing across the course of a bomber on a mission. It doesn't take much uncorrected drift to miss that pin-point objective on the chart. Hence the need for the highly skilled navigator who is such an important member of the typical American bomber crew.

Keen men deserve precise instruments. And our Service navigators get them. With the Pioneer Drift Indicator, an important member of "The Invisible Crew," the navigator is able to make quick, accurate observations of drift, ground speed and azimuth. He finds the Drift Indicator an important member of the Pioneer group of precise navigation instruments — a group working day and night to bring security to our pilots — and insecurity to our enemies.

PIONEER INSTRUMENT DIVISION,



Products of the Pioneer Instrument Division are important members of "The Invisible Crew," all the Bendix precision-built instruments and equipment made by 15 Bendix Divisions, serving with our fighting crews on every front.

PIONEER INSTRUMENT DIVISION

THE INVISIBLE CREW

Bendix

AVIATION CORPORATION

—*U. S. Navy Photo.*

ONE FROM FOUR LEAVES THREE. A Navy plane made this photo of a Jap transport bombed and sunk by an Army bomber at Kiska Harbor in the Aleutians. Around the burning Jap, however, are three other enemy ships, riding serenely at anchor. In the islands nearby are from 10,000 to 25,000 Japs and in nearby harbors are other Jap ships. They are on American soil, in American waters. They've been there for weeks. Air power obviously missed the bus in the Aleutians at a time when it should have been employed on an all-out scale to maintain the full confidence of the public. One boat was sunk by the AAF, as can be seen, but the photo shows more dramatically than words that one from four still leaves three.

AIR CARGO IN PERIL

THERE is considerable merit in the proposals by Shipbuilders Henry J. Kaiser and Andrew Jackson Higgins, who would have Uncle Sam replace unfinished surface freighters, or at least a substantial number of them, with huge flying boats which could transport men and materiel without risking torpedoes and mines. Washington would be stupid to ignore air cargo since public opinion has been aroused as it has.

But there is also an objectionable side to the matter. How will Kaiser and Higgins be rewarded? Certainly they can not hope to grab up orders for flying boats and build them lock, stock and barrel. They may be miracle men when it comes to shipbuilding and erecting New Deal dams of gigantic proportions. But building complex aircraft is another matter, far more difficult than assembling steel plates or pouring blobs of concrete into forms.

The shipyard folks, like the automobile makers, have made the mistake of ignoring aviation too long. But our friends of the automotive world had the presence of mind to go to the aircraft industry for guidance when their changeover came about. Even Henry Ford, the acknowledged master of mass production, couldn't jump into aircraft production as a prima donna—he's going to build Consolidated Aircraft's B-24's, not "Fords". Will the shipbuilders be as smart?

If sound judgment and horse sense prevail, Kaiser and Higgins will be welded without delay into a big aircraft pool as subcontractors to the existing aviation industry. After all, they're talking about aircraft which folks like Glenn L. Martin, Boeing, Douglas, Sikorsky, Pan American Airways and American Export Airlines have been tinkering with for quite some time, at considerable expense. That way lies victory. Any "experimenting" at this stage can result only in a costly, time-consuming, ineffective flop. That road leads to defeat.

Moreover, the entire future of air cargo stands to be jeopardized by half-baked, quick-remedy measures. It is tragic that air cargo, so long ignored, should now be threatened by bureaucracy simply because of high-pressure salesmanship.

We need Henry Kaiser and Andrew J. Higgins. We need air freighters on a large scale. We need top priorities for those Curtiss, Douglas and others are building right this minute.

But let's stay on the beam and go about this proposition with the skill and diligence which has made aviation as great as it is, despite the obstacles it has had and is now having to overcome.

★ ★ ★

No Room for Aviators

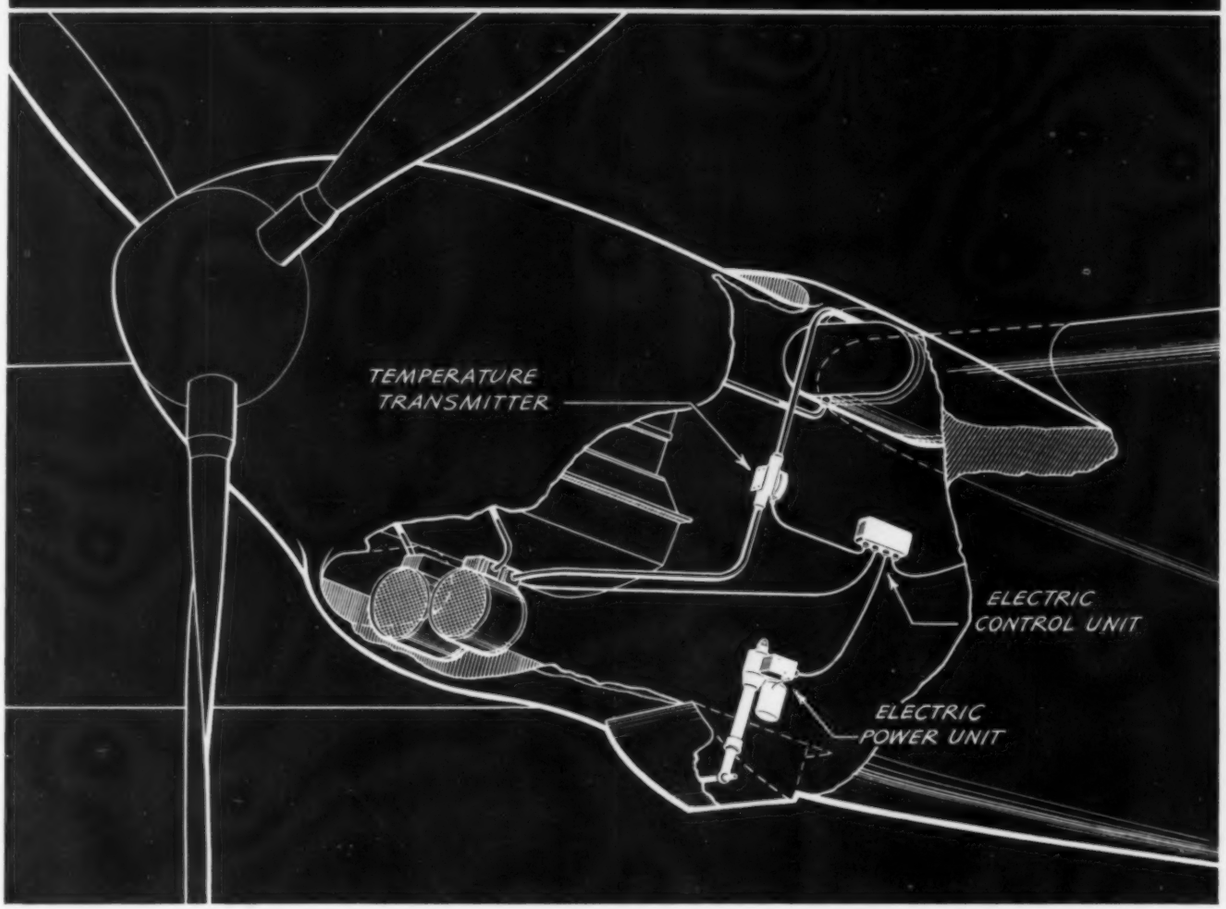
There are a lot of you old-timers in the flying game sitting up all day and half the night cussing and discussing the way the war is going. You holler and harangue about the batch of Jap beetles who occupy North American soil in the Aleutians and about the Jerries winning the game of hide-and-seek a few miles from our coastlines. You are unhappy about the way the airplane, your own child, has to find its destiny over the protest of sea-going admirals and the ground-hog generals who still dominate the war plans with antediluvian military thinking. You gripe and groan but it will avail you little. As a civilian, haven't you learned that in time of war civilians aren't supposed to have any sense? Haven't you learned that taking off your civvies and putting on a uniform makes you an expert?

Our unwanted advice to you old ducks in the aviation family is to do what so many of our confreres have done—get a nice juicy commission in the Army or Navy and forget the whole thing. The collapse of Russia, the rubber debacle, the new tax bill or the steel shortage won't bother you then.

Every Tom, Dick and Harry in America is yelling for air power since the battles of Midway and Coral Sea. Look what's happened to some of your old cronies who were universally accused of being a bit "screwy." There's old Al Williams, whose daily Scripps-Howard column is now avidly read by millions! Take a peek at Sascha Seversky whose "Victory Through Air Power" is a Book-of-the-Month selection and the nation's best-seller! Look at the winged ghost of old Billy Mitchell! Hell's bells, a steamship builder now points the way to American air supremacy by demanding the mass production of Glenn Martin's flying battle-wagon, the "Mars"! Can't you see that the airplane has now plumb pushed the auto off the editorial and even the advertising pages of the big magazines and newspapers?

The miracle all you old-timers dreamed about back in the days of hamburgers and home brew has been performed. The auto makers and the steamship builders, together with our far-seeing congressmen, will carry on for you now. *They* have discovered the airplane and *they* will save America.

Another cut in cooling drag!



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To give U. S. military airplanes these three added "edges," AiResearch engineers in cooperation with military engineers have now developed a fully Automatic Exit Flap Control System.

AiResearch's new electrically-operated control system cuts open-flap time considerably, reduces cooling drag. In engine oil cooling, an overriding pressure control supplements thermostatic control, making this the surest-acting system yet developed. And the simplest. Aircraft engineers designed it to operate without capillary tubes, sylphon bellows or electronic circuits. AiResearch Automatic Exit Flap Controls are easily adapted to every type of airplane . . . may be used on liquid coolant radiators as well as oil coolers.

Successfully flight-tested, this lightweight system is now in volume production. Military aircraft manufacturers may write or wire for details.

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Let's Lay The BLAME . . . Now!

Civil Aviation is Being Sold Down the River. A wide-open investigation of all military flight training can perhaps alone save it from further decimation. Wartime is no time to dodge issues. So doing would cover up costly mistakes that take lives and lose battles, thereby facilitating mediocre leadership and placing a premium on blindness, inefficiency and ignorance.

By GEORGE E. HADDAWAY

BLINDNESS, inefficiency and ignorance still surround civil aviation; its rich resources are rotting away while patiently waiting for complete, all-out use in the war effort.

We have been at war long enough to use every iota of the national wealth. We scour the country for scrap iron, rubber, copper and brass while we permit our military men to ignore one of the nation's richest assets—civil aeronautics.

Not only has civil aviation been ignored — it is now being pushed around; this time by the U. S. Army Air Forces. The Civilian Pilot Training Program, one of the two main elements responsible for the rapid expansion of our military flight training program, is now approaching the rigor mortis stage and faces collapse. The time has come to face the issue and lay the blame. The time is approaching when an investigation should be made and those military men who would destroy the training facilities and the ready-to-use specialized services of civil airmen and aircraft, should be called up to explain their attitude and their actions.

Army Doesn't Want CPT

Such an investigation, if the testimony could be unmuzzled, would probably result in a lot of fireworks and some fallen timbers. Some of our so-called great military leaders, who have about as much foresight and imagination as a Callahan County dry-land terrapin, would go down in the melee, for no unbiased, intelligent and wholly objective approach to the civil aviation situation could possibly be made without the subsequent condemnation of some military policies and thinking that are the unhappy equivalent of the things that went on in France prior to her collapse.

We strongly urge such an investigation if for no other reason than to save a portion of the nation's assets that must be turned into action if we are to win this war.

Due to ignorance and lack of clear intelligent thinking the ground Army has drafted thousands upon thousands of air specialists who are sorely needed now in the tremendous but tardy push for airpower. Due to ignorance and lack of planning, hundreds of lives and millions of dollars in hard-to-replace aircraft have been destroyed. Due to the timidity and lack of imagination among our military air leadership, we have failed to provide this nation with a national air policy and at the same time, a unified command.

Navy Sees the Light

To cap the climax, the Army Air Forces, with thousands upon thousands of flight training recruits stacked up on the shelves, idly waiting to be called, turns thumbs down on the Civilian Pilot Training Program with no explanation why. What reasonable person, military or civilian, could deny the sagacity in providing these prospective pilots preliminary training that would give them a modicum of experience until the Army's facilities could take care of them? Civil aviation has training planes by the thousands—still idle; competent, seasoned instructors, training fields and service facilities that a simple flick of a switch would set into motion.

The Army Air Forces can throw that switch but it won't. And it won't say why. It doesn't have to say why —unless some of our sleeping congressmen should get agitated about such gross and criminal negligence. Meantime these rich and ready facilities are being decimated.

The Navy finally came around. For years, the Army has been the big user of CPT facilities. By some strange fate, while the Army now holds back, the Navy steps in and asks for some 20,000 trainees, most of whom will go on up the ladder for combat, while the Army turns a cold shoulder to CPT and asks for about half as many trainees, all of them in "specialist" classes and none of them for combat.

Meanwhile a good two-thirds of civil aviation resources for training go begging.

Too Much for Hinckley

Could it be that the Army dropped out because the Navy came in? That's hard to believe in times like these. But from other observations where divided authority between Army and Navy has been evident, some mighty interesting but costly developments affecting the winning and losing of battles have come to light.

Some of us in civil aviation have been spectators in the conflict brewing between the Civil Aeronautics Administration and the U. S. Army Air Forces since early this year, culminated last month by the resignation of Robert H. Hinckley, assistant secretary of commerce, for air, and mainstem of CAA's civilian pilot training. The loss of Hinckley to civil aeronautics is a heavy blow from which it may

never recover until after the war. His resignation, probably germinated by Army brass-hatism and accentuated by the Army's reduction in requirements from CPT and by inter-departmental difficulties, has brought despondency to many a fixed-base operator who has been plagued constantly by low-rated priorities, step-child status from uncertain quotas, selective service practices and ever-changing requirements and procedures wherein he had to become a mixture of magician and prophet in order to survive. Now his best friend at court is gone.

Before Hinckley resigned, he made the following pointed statement before the National Aeronautic Association in New York: "It sometimes happens that a governmental agency becomes so strong that it loses touch with the people, who really own it, and begins to fight not for the people but for itself." Like so many good people in this nation, the former assistant secretary of commerce for air believes that this war, if we win it, will be won not by the Army, or the Navy, or the President, or the Administration, but by all of us, working as a team, each doing his part to his fullest and to the best of his ability. To our way of thinking, anyone who fails to share that belief is a danger and a threat to the United States of America, incapable of authority, unworthy of trust and devoid of the necessary attributes for successful military leadership.

CPT's Record

Civil aviation has produced rich results for Uncle Sam in the past. CPT trained 10,000 pilots in 1939 while the Army turned out about 500. To date CPT has had over 120,000 enrollees with a safety record that makes all other agencies ashamed. Some thirty thousand of the graduates are wearing wings in Uncle Sam's air forces. Several thousand of them are flight instructors for Army and Navy schools and in ferrying service. Other branches of civilian aviation have likewise made their contribution. Look at the thousands of civilian airmen whose training and background in civil aeronautics prepared them for the commissions they now hold in the air services, — training and background that didn't cost the Army or the Navy one red cent.

Why must our military leaders think of air power for America in terms of but one to two million men? Why can't they break the shackles of blindness and think in terms of five or even eight million men for *global* air power? Through the full utilization of civilian aviation resources by our military leaders the creation of an Air Force of five million men could readily be set in motion. If nothing else, run 'em through the CPT, and turn them over to CAP preliminary to specialized military classification and advanced training! The money saved in lives and equipment would alone pay for the cost of CPT and a healthy tour of active duty on Civil Air Patrol assignments.

While proposing an investigation into our military flight training programs, we therefore propose that the agencies of civil aeronautics be handed the job of pre-military flight training. It might show up a lot of our antediluvian military training experts as a pitiful gathering of old fuddy-duddies, but we at least could start the ball rolling for airpower in the size and quantity required for the job we've got to attend to. We could take the thousands of candidates now standing in line for air training month after month, and expose them to propellers, engines and instruments in the stead of "Jingle-Jangle" down at the corner honkey-tonk.

There's more than one way to carve a goose — and there's a lot of good sound ways to turn out fighting flying men without all the strangle-holds of ancient fetishes that have so spectacularly played havoc with the cause of democracy in Poland, France, Crete, Pearl Harbor, the Philippines, Singapore and Malaya. Will it be repeated over Alaska, Africa and the Near East?

How to Get the Job Done

We are not building up technically trained manpower fast enough. We have too many ribbon clerks and not enough technicians, too many red-tape artists and not enough fighters. Unless we let loose the dammed-up energy and facilities of civil aviation, we'll continue to deal in small thousands instead of necessary millions—the old story of too little and too late.

But by turning this flood of energy and equipment loose and by the sensible and intelligent employment of the teachers and tools we already have in existence, we can and we must lift ourselves from the lethargy of the same brand of military thinking that kept us chained to the belief (until last year) that only college graduates and twenty-two-year olds could become combat pilots.

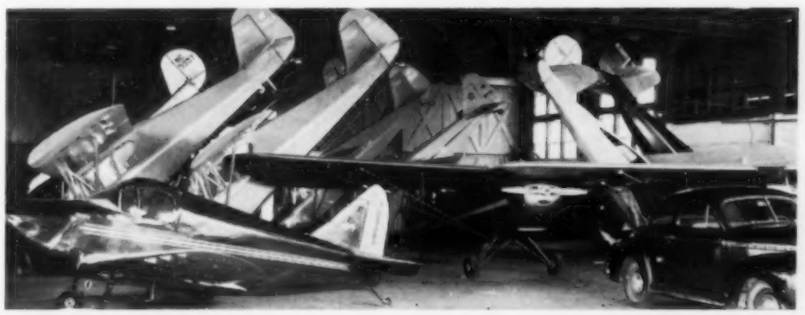
The quickest way to destroy once and for all, to smoke out that type of unconscious sabotage from its comfortable nests in high places, is by thorough investigation in the good old American system of "How do you get that way, Bud?" Let's fix the blame, now.

Give us a thirty dollar compass, a good CPT instructor, a wooden hangar on a sizeable cowpasture, a putt-putt to start with, a tour of duty on the front line with the Civil Air Patrol, and we'll find our way, first to the finest combat airplanes in the World that are now rolling out of American aircraft factories, then on through the ozone to the complete defeat and annihilation of our crafty adversaries.

Think we can't do it? Then go to the record for it is all there in black and white—in facts, in figures and statistics.

Let the record of civil aeronautics, easily available, speak for itself. Let the truth of the record filter through to 135,000,000 Americans. Then the tragic waste of men, of machines, of talent and material in civil aviation will disappear like morning mists over the deep blue waters off the Texas Coast.

This doesn't make sense!



ALL OVER AMERICA airplanes like these are stacked into hangars in dead storage. While we search for scrap rubber and metal, we let our most precious asset—airplanes —rot. Their pilots are drafted into the foot Army in large numbers. Both could be kept busy training more and more pilots. What's wrong? Let's have an investigation and find out.

JUMPING CLOSELY together, Para-Marines will land in small clearing to launch attack on nearby installations.

RIPCORD WARRIORS OF THE MARINE CORPS

By **FIRST LT. GORDON HAGBERG**
United States Marine Corps

A goodly part of the wallop packed by the Marines will spring from paratroops. When the Leatherneck team strikes from above and in front, the 'chutists will loose hell from the rear. Here's their formula.

THEY can jump and they can land. They can float and they can fight. They're as good at 'chuting as they are at shooting. Yes, they're the toughened warriors of the ripcord, the Para-Marines.

There was a time when "amphibious" was the standard of versatility. Then the Marines sprouted wings and became soldiers of the sea, land, and air. Now the Para-Marines are adding a new activity to the full and diversified record of the United States Marine Corps. They're demonstrating what can be done by well-trained troops dropped by parachute behind the enemy lines.

Training Is Strenuous

The fundamentals and fine points of this new kind of warfare are taught to hundreds of young Marines at Camp Gillespie, the new Marine Parachute Training School attached to the Marine Corps Base at San Diego, Calif. Located near the once sleepy little town of Santee, California, the recently-opened school is now in full operation. The two 250-foot towers are used to capacity in turning out rugged and agile Para-Marines. Another Marine Parachute School has been constructed at New River, North Carolina.

There will be no dearth of men capable of striking hard behind the enemy lines, if the Marine parachute training is any criterion. Volunteers all, Para-Marines are selected from Marines on active duty between the ages of twenty-one and thirty-two. They receive $50 a month above basic pay. They must be in excellent physical condition, with special attention being paid to strong bones and joints, and a stout heart. Also essential are good sight, hearing, and a perfect sense of equilibrium. Since it is important that all troops land at about the same time and close together, it is required that the men be of average weight and height. The weight limits are 135 to 190 pounds, and the height limits five and a half feet to six feet, one inch.

Sturdy though they may be when they come to training school, Para-Marines must undergo physical conditioning of the most strenuous sort. The need for a strong and supple body is readily understood if you consider that landing in a parachute is about the same as jumping off a car going at fifteen miles per hour, and the landing impact is equal to that of a jump from an eight-foot wall.

TRICKY "slipping" guides 'chutists just beyond menacing tree tops.

Three Kinds of Jumps

The six-weeks training course is divided into three stages of two weeks each. First come conditioning exercises and learning how to pack a parachute and how to land and jump from a dummy plane.

In the second two weeks, the trainees continue their exercises which

increase in difficulty and intensity. Special emphasis is laid on tumbling and how to roll with a fall instead of absorbing the shock. The men are also taught to jump from the 250-foot towers, first from the controlled tower, in which the descent is guided by cables, and then from the "fly-away" tower, in which the parachute falls free but is opened before the drop begins.

High point of the training course arrives with the last two weeks when the trainees are taken up for their first parachute jump from a plane. Conditioned physically and mentally for this moment, the Para-Marines take it in their stride.

First they perform what is known as a "static-line" fall. Attached to each parachute and folded against the pack is a long strip of canvas. The free end of this is attached to a wire line in the plane and when the parachutist jumps, the other end acts as a rip-cord, automatically opening the 'chute. Inside the transport at a signal from the jump-master, the men fasten their lines to the guide wire, which leads to the rear of the plane. The jumping port is located in the rear of the plane to reduce the danger of the billowing 'chute or shrouds becoming fouled in the wings of the plane. In quick succession, the men move up in the line and jump as their turn comes.

Other kinds of jumps are the free fall and the delayed jump. In the former, the jumper pulls his own rip-cord upon leaving the plane, while in the latter he allows himself to fall through the air for hundreds or thousands of feet before pulling the rip-cord to open the parachute. In combat, however, these jumps would rarely be used, since most of the jumping would be from a low altitude. In addition to placing the men and equipment close together, the low-altitude, static-line jumps expose the men to enemy fire much less.

The lowest altitude at which jumps are usually made is about 300 feet, while a jump has been made from as high as 30,000 feet—most of the distance delayed. The notion that a fall of more than 100 feet would produce unconsciousness has long been exploded. In falling, the eyes determine the sense of balance. And it is possible to hear during a drop, although the roar of airplane motors might temporarily drown out other sounds. Generally the men can hear each other or persons shouting from the ground while they are "under sail".

Fine Points of 'Chuting

The Para-Marines are taught how to manipulate the shrouds of the parachute to control the direction in which it drifts. If a descending parachutist wants to avoid rocky terrain or a body of water, he can "slip" the 'chute. By pulling on the shrouds on the right side, for instance, he spills the air out of the parachute canopy on the other side, making the 'chute descend faster and causing it to drift more to the right. Similar manipulation in any direction enables the parachutist to control the direction of drift to a limited extent, much the same as a sailing boat.

In landing, the parachutist can reduce the shock by chinning up on the suspension lines, landing on the balls of the feet, flexing the legs, wheeling around to face the wind and rolling in a back somersault. All this, of course, has been practiced so much that it becomes second nature. If a strong wind makes it difficult to control the parachute after landing, the Para-Marines lose no time in getting into action and simply cut the shroud lines with a spring-blade knife which they carry.

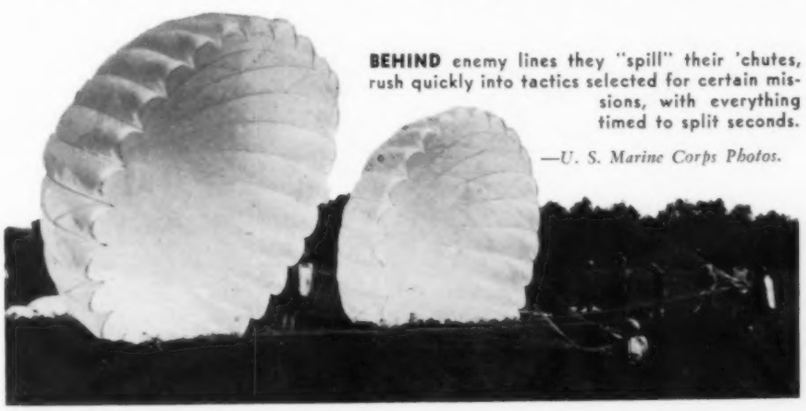
In action the Para-Marines wear heavy cloth jumpers with large pockets. The trouser ends are tucked into high leather boots. On their heads they wear a leather helmet, similar to an aviator's helmet. Over this is a plastic helmet, the same shape as the steel helmet which goes over all. This helmet covers the back of the head, the sides of the face and the forehead. It is of the same type being issued to enlisted men of the Marine Corps.

JUST BEFORE LANDING Marines "chin up" on the suspension webs, thus easing the shock on striking the ground.

Plenty of Fire Power

The fire power of the Para-Marines has been greatly increased by equipping them with sub-machine guns. Other things they carry include hand grenades, ammunition, concentrated food and water. Cargo 'chutes carry heavier pieces, anti-tank guns, trench mortars, and heavier machine guns. The Para-Marines learn to assemble these quickly upon landing and deploy for action. The general function of parachute troops is to attack the enemy from the rear, disrupt his communications, seize vital positions, etc., while the main body of troops makes a frontal attack.

From the time the first group of Para-Marines underwent training in 1940 at the Naval Air Station, Lakehurst, New Jersey, to the present, the U. S. Marine Corps has been building up as fine a body of specialized fighters as it is possible to develop. Keen, alert and with stamina to spare, they take their place in the front ranks of a corps which itself has comprised the front ranks of this nation's fighting forces for generations.



BEHIND enemy lines they "spill" their 'chutes, rush quickly into tactics selected for certain missions, with everything timed to split seconds.

—U. S. Marine Corps Photos.

Dallas High School Teachers Prepare Themselves in CPT Ground Course at Southern Methodist University.

The South Places Aviation In Its Public Schools

By TOM ASHLEY

WHILE the rest of the nation centers attention on a government-sponsored experiment to teach aviation in twenty-one selected high schools, public school education in aeronautics has surged forward with impressive beginnings throughout the South, where 90 per cent of the country's flight training is centered. Come September, when classes resume for the 1942-43 term, kids in hundreds of Southern schools will be introduced to pre-flight courses.

A survey of eleven Southern states reflects tremendous interest among public school officials in the possibilities of adding aeronautics first to high school schedules and later to lower grades. The ball was started rolling last May in Nashville, Tennessee, at a conference called by the National Council of Chief State School Officers with the co-operation of the U. S. Office of Education, the Civil Aeronautics Authority and the Army and Navy. School leaders gathered there were given general outlines of the vital role public school courses would play in national defense, and, with suggestions as to the essentials of such courses, returned to their offices to work out their plans. They've been busy ever since, faced with the need of quick action before the new term opens next month. Here's what has happened in eleven Southern states:

Alabama—Now formulating plan to include pre-flight training for high school seniors, the course to be an elective. Interested in aviation instruction in all grades.

Arizona—Most high schools expected to make pre-flight science of aeronautics course available to junior and senior boys and girls during coming year.

Arkansas—Pre-flight courses in all high schools where personnel and facilities available; comprehensive emergency courses in general mathematics in all high schools; increased emphasis on a four-year course in mathematics; similar emphasis on science courses.

Georgia—Pre-flight instruction for some of the larger high schools, a few offering a full course while others combine aviation with the course in physics.

Kansas—Authorized a course in elementary aeronautics for high schools and approved a textbook. Aviation in elementary schools expected to follow soon.

Louisiana — Accelerated wartime program of mathematics and science launched to aid small high schools and others, handicapped by lack of experienced instructors or suitable laboratory equipment. Courses, based on recommendations by the National Council of Chief State School Officers, will provide foundations on which later specialized teaching of aviation may rest. Definite steps to place aviation in schools expected soon.

Mississippi—Several local schools plan aeronautics courses this fall.

Missouri—State Department of Education recommended that high schools next year offer a one-unit course in aeronautics accredited toward graduation as a science and including such topics as Types and Uses of Aircraft, Aerodynamics, Navigation, Meteorol-

ogy, Aircraft Engines and Aviation Regulation and Flight Safety.

Oklahoma—Number of city schools expected to offer course beginning in September.

Tennessee—No definite plans for courses, but will emphasize mathematics and physics as required by the Army and Navy.

Texas—While the state has not worked out any course to include aviation, it has consented to recognize any course in aviation offered locally and a "good many" schools are discussing such courses.

Typical of the determined manner in which Southern city schools have tackled the problem of obtaining teachers to discuss aviation intelligently, Dallas officials lost no time in grasping the importance of the Civilian Pilot Training program and its advantages. In mid-summer eighteen teachers enrolled in CPT classes at Southern Methodist University. They studiously followed courses in civilian air regulations, aerial navigation, meteorology and general service and operation of aircraft to prepare themselves for aeronautics classes in their schools next month. In this manner Dallas avoided delay and expenses and utilized existing facilities to familiarize their teachers with aviation. They sat in with the same classes in which Army and Navy pilots were receiving ground school instruction.

Some of the states are going ahead with excellent plans of their own. Alabama's state university hurriedly provided a summer course on aeronautics for teachers, accomplishing much. Nevertheless, A. H. Collins, state superintendent of education, tells us: "This may help, but there will be very few teachers with the necessary background. Many of our teachers in these fields have left the schoolrooms for industrial employment and the armed services." In Arizona, courses for the preparation of teachers for teaching aeronautics were offered this summer at the two state teachers colleges at Tempe and Flagstaff. Short, intensive refresher courses are planned for August in all of the state colleges of Arkansas for the benefit of prospective teachers of aeronautics in high schools during the coming term. Missouri's teacher-training institutions are trying as best they can to prepare teachers for high school aeronautics.

Arkansas Is Model

We think other states would benefit from a brief report by Ralph B. Jones, state commissioner of education of Arkansas. He says:

"Our public school and college administrators are intensely interested in this matter. On May 12-14, two members of the State Department of Education staff and I attended a conference in Nashville, Tennessee, called by the National Council of Chief State School Officers with the cooperation of the U. S. Office of Education, the CAA, the Army and the Navy. A week later two other members from this department attended another conference at Nashville, sponsored by the CAA and aeronautics organizations of the various Southern states. On June 2, I called a joint advisory committee meeting of members of the Department of Education staff and public school administrators and teachers. On June 12, at my suggestion, a meeting of college administrators was called in my office.

"As a result of our participation in discussions at these four conferences, we have prepared a comprehensive program which includes:

"1. The introduction of pre-flight aviation courses in all the high schools of the state where personnel and facilities are available for such courses.

"2. The introduction of comprehensive emergency courses in general mathematics in all high schools.

"3. Increased emphasis on a four-year program of mathematics in all schools able to offer such courses, with particular emphasis on the functional aspects of mathematics as applied to the needs of the armed services of the nation.

"4. Similar emphasis on the science program in all high schools of the state where facilities and personnel are adequate to the task.

"5. The introduction of short, intensive refresher courses in all of the state colleges during the month of August for the benefit of prospective teachers who need review or additional work in these fields to prepare them for teaching in the high schools during the next school year.

"6. Co-operation with the Civil Aeronautics Authority in their program for encouraging high school teachers to enroll in Civilian Pilot Training Ground School courses being offered this summer in various colleges of the state.

"7. Maintaining close contact with the U. S. Office of Education and all other agencies specifically interested in the adjustment of the total educational program to meet the emergency needs of the day."

That, we believe, is about tops for all-round planning for aviation instruction in Southern schools. Other states also have excellent plans. Here's a round-up:

Alabama

"This Department is very much interested in bringing appropriate aviation instruction into our public schools at every grade level. It is likely that this cannot properly take the form of *courses* until about the eleventh or twelfth grades. However, as our teachers become qualified, much significant teaching can be done at all levels in connection with the entire curriculum. This is provided for in our curriculum setup, not as aviation but under social education wherein transportation is important, but like many other important phases of the program, will be effective only as teachers are sensitive to the problem, and are qualified to give the proper sort of instruction.

"The Division of Instruction in this Department is studying the materials from the Office of Education, the Civil Aeronautics Authority, and other sources, and the announcements in regard to the ATCA. We hope to be able soon to make definite announcement of policy and suggestions looking to the inclusion of a course in pre-flight training for senior high school pupils. Such a course would be an elective, with credits as in other subjects. The question of offering electives such as this is determined by local schools or school systems, and not by this department.

"It is likely the number of schools offering such courses as aviation will be small at first. This will be due to teacher shortage in the fields covered, especially in science. Our State University has just announced a summer course for teachers. This may help, but there will be very few teachers with the necessary background. Many of our teachers in these fields have left the schoolrooms for industrial employment and the armed services."—A. H. Collins, State Superintendent of Education, Montgomery, Alabama.

Arizona

"Courses for the preparation of teachers for teaching aeronautics in the schools are being offered this summer at the two Arizona State Teachers' Colleges, at Tempe and Flagstaff.

"As to the schools which will offer pre-flight science of aeronautics courses next year, we anticipate that most of our high schools will comply with the request of the Civil Aeronautics Authority and the United States Office of Education in making this course available to junior and senior boys and girls, but as yet we do not know precisely which schools will make this offer."—E. D. Ring, Superintendent of Public Instruction; D. Ross Pugmire, High School Visitor and Direc-

tor of Research and Guidance; Phoenix, Arizona.

Georgia

"An effort is being made to introduce into some of the larger high schools of Georgia some instruction in pre-flight aviation. In some instances, we believe that a full course will be given to this subject; in other places, this instruction will constitute a part of the course in physics.

"We are studying recommendations made by the U. S. Office of Education and by the National Council of Chief State School Officers and expect to make some progress during the year in meeting this need."—W. E. Pafford, State High School Supervisor, Atlanta, Georgia.

Kansas

"The State Board of Education recently authorized a course in elementary aeronautics for use in the high schools of the state and approved a text book for use in connection with that course. Some two weeks ago Dr. George W. Frasier, president of Colorado State College, Greeley, Colorado, a representative of the U. S. Office of Education and also of the Civil Aeronautics Authority, spent a week in our state. In company with our two high school supervisors he addressed some fourteen groups of school men, explaining the situation with reference to the development of public school opinion characterized by an awareness and alertness about the place of aeronautics in American life. At these meetings the whole matter was gone into in some detail. Just what will develop from this series of meetings is not yet entirely clear. We do know, however, that quite a number of the larger high schools of the state are now planning to set up such a course at the opening of school in September. We are gathering material to assist the school men in carrying on such a course effectively.

"So far we have not taken any measures looking toward the setting up of such a course in the elementary school. However, it seems quite certain that the interest in connection with the high school course will penetrate downward into the elementary school and that management valuable to the development of an aeronautical state of mind will undoubtedly make its appearance in elementary school teaching."—W. A. Stacey, Assistant State Superintendent of Public Instruction, Topeka, Kansas.

Louisiana

"The Louisiana Department of Education is preparing to launch an accelerated wartime program of mathematics and science in schools this fall and has distributed outlines for teaching emergency courses in physics and mathematics. Based on courses recommended by the National Council of Chief State School Officers, these outlines are particularly designed to aid small high schools, handicapped by lack of experienced instructors or suitable laboratory equipment, to meet the wartime demand for more American youth trained in the fundamental principles of mathematics and science on the high school level."—John E. Coxe, State Superintendent of Education, Baton Rouge, Louisiana.

Mississippi

"Several local schools are planning to offer courses in aeronautics this coming school year."—W. D. Gardner, State Supervisor of Trade and Industrial Education, Jackson, Miss.

Missouri

"The Missouri State Department recently recommended that Missouri high schools next year include a one-unit course in aeronautics. The course will be accredited toward graduation as a science. It is not expected that every school will offer the course, since some will lack facilities, equipment and perhaps a qualified instructor.

"Tentative plans for the course indicate that it will follow pretty much the pattern now in use in some schools, based largely upon recommendations of the CAA. It probably will include such topics as Types and Uses of Aircraft, Aerodynamics, Navigation, Meteorology, Aircraft Engines and Aviation Regulation and Flight Safety.

"The teacher-training institutions in the state are working on outlines for the course and also are trying to prepare teachers to teach the course. It is planned to furnish schools with courses of study and other materials before school begins in the fall.

"We are unable to estimate at the present the number of schools that will offer the course."—Lloyd W. King, State Superintendent of Public Schools, and Claude M. Dillinger, Supervisor of Curriculum, Jefferson, Missouri.

Oklahoma

"A number of city superintendents held a meeting in Oklahoma City recently at which Dr. William L. Wrinkle, Jr., and Dr. Ben D. Wood of Columbia University appeared and presented the national program for teaching aviation in the public schools. Those present manifested keen interest in this new course and endorsed the plan as outlined by these two gentlemen. It is my belief that a number of these schools will outline and undertake this course for the school term of 1942-43. This term opens in September. At this date I cannot give you a definite number of schools that will participate in the program.

"We have received the information from the U. S. Office of Education and this Department is co-operating in every way possible in the total movement." — A. L. Crable, State Superintendent of Public Instruction, Oklahoma City, Oklahoma.

Tennessee

"We have made no definite plans relative to teaching aviation in the public schools. We are planning to emphasize mathematics and physics as required by the Army and Navy." —B. O. Duggan, State Commissioner of Education, Nashville, Tennessee.

Texas

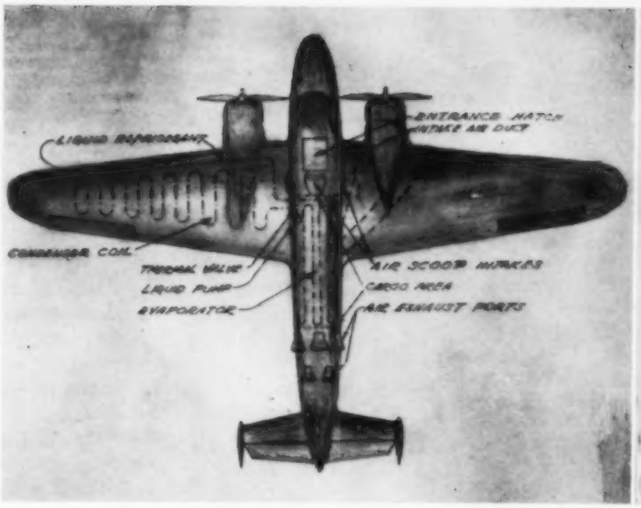
"The State Department of Education has not worked out any course to include aviation either in grammar school or high school. It has, however, given its consent to recognizing any course offered on aviation in the high school when worked out by the local superintendent.

"Courses in high school are offered by the local school district and are not forced upon them by the State Department of Education. We merely give our approval and if there are any districts in Texas that desire to place this course in their high schools, then we shall be glad to recognize such a course. A good many schools over the state are discussing the possibility of offering a course like this, but up to the present time none have notified us that they have offered or will offer such a course."—L. A. Woods, State Superintendent of Education, Austin, Texas.

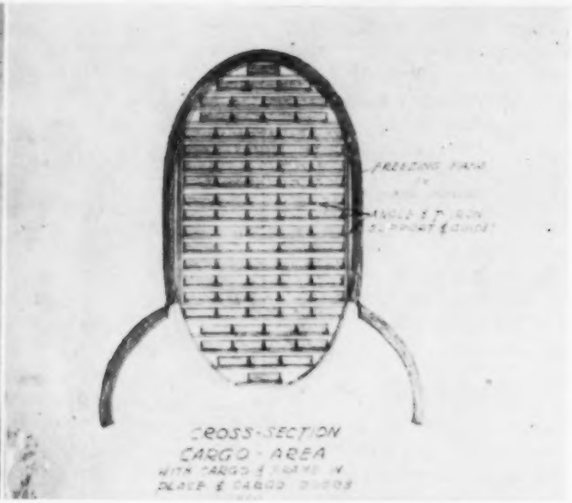
Where to Obtain Data on Aviation for Youth

School officials or other interested persons may obtain full information regarding aviation courses for young people from several sources. The list includes the U. S. Office of Education, Washington, D. C.; Bruce Uthus, Civil Aeronautics Authority, Commerce Building, Washington, D. C.; A. L. Lewis, Director of Air Youth Division, National Aeronautics Association, 718 Jackson Place, N. W., Washington, D. C.; Dr. H. W. Hurt, Director, Air Scouts, Boy Scouts of America, 2 Park Avnue, New York, N. Y.

These agencies and men will be glad to answer inquiries addressed to them.



STRATO-FROSTER as envisaged by Engineer Grayson would carry four to eight tons of perishables. He would locate refrigerants, condenser coils and air ducts as shown in this drawing.



RACKS OF FOOD would be carried like this, in trays. Assembled in units, the trays would be loaded hydraulically from pits at the airport. Doors are like those on bomb bays.

Strato-Frosting Foods . . . Post-War Job For Aviation

A practical-minded engineer, who knows the frozen-food business well, recommends the sub-stratosphere as the high-road to profits in transporting perishables. He hopes it will be developed, for strato-frosting would give employment to war pilots in peacetime.

By RALPH V. GRAYSON

Consulting Engineer

THE present emergency is revolutionizing production methods in every phase of American industry. The conversion of great industrial plants to war production plants almost overnight has not only challenged the Axis nations' war production but has instilled a fear that is shattering their diabolical regimes.

The industrial angle of war mechanization lends itself readily to economic adjustment from war to peacetime. It is future economic and personnel problems that must concern our nation now. Taking men from one vocation to another is in no sense mechanical and must not be regarded as such.

Post-War Planning

The American people are a free people who are highly democratic, who choose their professions and vocations —they live the work that they do— and, when in national emergencies their vocations are diverted to new fields, a natural psychological change takes place. We can not expect them to stay in the military organization after the job is done nor can we expect a complete transition to old customs and vocations without some economic readjustments. The American industrialists, financiers, and scientists must lead the way back to the free and abundant life which is America's God-given heritage.

Our ship-building industry must continue production of ships for replacement of those lost during this war and to develop more efficient fishing fleets and merchant marine to rehabilitate the fishing and shipping industries of the invaded countries of this present war whose fishing and shipping fleets were seized or destroyed. Ship production will stimulate the steel industries to an extent nearly equal to the present demands. The chemical and automotive industries can revert to peacetime operations and will require several years to reach surplus stages. The excess army trucks, jeeps, etc., can be used in transportation and agricultural pursuits to a good advantage. The aviation problem is the one that must be adequately met.

Our country has spent billions of dollars in warplanes and great plants to produce this necessary fighting equipment, not to mention thousands of the finest young Americans who have been trained for our defense

through the use of the most formidable war weapon, the airplane. This branch of the nation's defense must never be allowed to disintegrate. What are we going to do with the great fleets of planes and the highly-trained personnel?

Every red-blooded American owes a debt of gratitude to the fighting men of the U. S. A. and it behooves us to begin now to plan for their future by supplying congenial employment for them closely allied to their new vocations.

Quick-Freezing Popular

Apparently there are two fields of endeavor that can absorb a great percentage of the post-war surplus of planes. One is transportation which might be divided into three classes, namely: passenger, express, and freight. The other is the strato-frosting of fresh fruits and vegetables at high altitudes and transporting perishable food to metropolitan markets. The great American aviation passenger service is in the hands of the ablest industrial and scientific men of our nation. This fact is attested by the unexcelled progress and leadership that has been given the world-wide aviation industry. This group should be interested in strato-frosting equipment leasing service, for quick-freezing of food products.

Within the past decade quick-frozen foods have become a predominate factor in the food industries. Scientific studies of raw products, pre-freezing treatments and quick freezing methods have revealed many important factors essential to quality production. The raw fruits and vegetables must be horticultural strains that are suitable for quick freezing. The great scientific agricultural institutions of our country have provided us with the proper strains of fruits and vegetables for quick freezing. We have again called on science to show us how to pre-treat these raw products to prevent oxidation and disintegration during quick freezing, storing and shipping and merchandising cycles. They have given us the right answer, as usual.

The quick-freezing technique is now very definitely established and is accomplished by many different methods, all of which are in the lower order of temperatures to effect the shortest cycle of freezing possible, which produces the highest quality of food.

Refrigeration quick-freezing systems, to reach the requisite temperatures, should be multi-staged which involves a series of compression stages, inter-cooled between each stage and a perfectly balanced operation with technical care. Plants of sufficient capacities to warrant substantial production are expensive and immobile except in some instances where small portable units are used, in which case refrigeration facilities of a permanent nature have to be provided and maintained.

Strato-Frosting Explained

The writer has made a lengthy study of every phase of quick freezing and on many occasions transported frozen foods from Chicago to Fort Worth in the air for samples and personal consumption, without refrigeration, except as supplied by the higher altitudes during the flight. These preliminary investigations indicated the great potential of strato-frosting of foods.

The prices of airplanes and the earlier types made it impractical to consider commercial operations of quick freezing by strato-frosting at that time. Now that we can fly safely in the sub-stratosphere and we have trained men who will be eager for this employment, it is safe to say that aviation will soon take its place in the quick-frozen foods industry.

The great advantage in strato-frosting of foods is the clean rarified air that can be directed over the honeycomb of packages within the fuselage of the plane which, operating under normal atmospheric conditions, can reach a temperature of 45°F. at an altitude of about 28,000 feet. There is no limit to the air velocity over the load, light materials such as aluminum and Dow metal can be used for grids and supports in order to maintain the lowest possible dead load and give great structural strength to the fuselage.

The operation of a strato-froster is simple and automatic. The use of exhaust gases and heat in conjunction with absorption systems and eutectic solutions will keep the product under constant refrigeration after quick-freezing is accomplished.

The time cycle of freezing is contingent upon the altitudes and the size and kind of package used. One-pound retail package can be frozen within forty-five minutes while five-pound packages will require two and one-half hours. A strato-froster will carry from four to eight tons per frosting flight.

The great advantage of strato-frosting is that the operations can be carried on from any part of the country and even to adjacent countries. The mobility of the equipment provides the means for all-year operation which is a financial boon to the whole industry. It is very difficult to pay yearly dividends on three to six months' cycles of industrial quick-freezing plant operations. By this new quick-freezing plan freezing operations can be conducted daily throughout the year following the production cycle from the tropics to the arctic.

A Look at the Future

A typical strato-froster with sectional drawings is shown to illustrate the modifications of standard transport planes for this new phase of aviation industrialism. Packages can be designed with the attractiveness of aviation symbols in frozen food packages and the eye appeal which is so necessary in food packaging.

Strato-frosting of food involves modernized packing and storage facilities at the landing field with hangar type loading depots. The strato-frosters will be wheeled over the loading pits and the froster bays opened. The racks of raw products will be raised by a hydraulic lift into the froster, made fast and ready for the froster flight to begin. At completion of the quick-freezing the product will be returned to the froster hangar or delivered to the central storage plant quick-frozen in transit.

The use of strato-frosters in the transportation of fresh and frozen foods means the tree and vine-ripened foods can be delivered from the remote producing areas to the great metropolitan consuming areas overnight, thus eliminating withered and unripened foods in the markets. Only products of a high vitamin and nutritive state will be furnished the markets through this medium of transportation and quick freezing. The transportation of fresh foods will be conducted in much the same manner as frozen foods except that the load will be top iced and the strato-frosters will be flown at heights which will maintain requisite temperatures.

The transition of our greatest defense unit into peaceful industrial pursuits is typical of our great democracy. This unit can be converted back to defense of our nation if it should become necessary; thus will be written a new industrial page of American aviation progress.

A program of this kind involves many phases of co-ordination of the industries directly interested and time is essence. The problem of reconstruction is paramount throughout the world. Our efforts must be directed to the international problems but our first duty is to adjust our industrial shock absorbers to the relief of our domestic personnel employment problems in the post-war period.

HUMBLE-ESSO AVIATION PRODUCTS

Flyers and Fuels

that are Tops

Man for man, American Fliers have proved themselves superior to the most seasoned pilots the Axis can send against them. Gallon for gallon, American made Aviation gasolines also have demonstrated their superiority to the most potent *ersatz* fuels. Because this is true — because there are men to fly them and fuels to power them, there will come from the assembly lines of American plants superior planes that shall blast the Axis from the face of the earth.

Humble-Esso Aviation Products will have a part in that great accomplishment because they are already in the thick of the fight. Producing Humble-Esso Aviation Gasoline and Humble-Esso Aviation Oil is part of the war job to which Humble is dedicated — there will be no let-up until Victory is ours.

HUMBLE OIL & REFINING COMPANY

13,000 Texans United in the War Effort.

POWERED ASSEMBLY PRODUCTION

George Newman's B-24's have set records for production ever since the huge new Consolidated factory was opened in Texas. He's extending himself now with massive assembly lines humming 24 hours a day.

BOMBERS . . . .

By BILL SHERRILL

LESS than a year ago leading production engineers said it couldn't be done.

It just wasn't possible, they maintained, to build a mechanized assembly line capable of carrying heavy four-engined bombers. Light training planes, yes, but huge battlewagons of the air—never.

Well, in Texas those "experts" have their answer. It's Consolidated Aircraft Corporation's huge windowless plant, which, less than a year after the production experts' verdict, turned out its first heavy, long-range bomber on a completely mechanized assembly line. Not only was it the first Texas-built four-motored ship, but it came off the line 100 days ahead of schedule and exactly a year to the day after the first spadeful of earth was dug at ground-breaking ceremonies for the plant-to-be.

Meet George Newman

Since that portentous day exact duplicates of the first Consolidated B-24D have flown off the line in ever-increasing numbers, still ahead of schedule. They've joined the stream of planes Texas' growing aircraft industry is producing in the common task of overwhelming the enemy.

Back of the records Consolidated is setting in delivering high-speed, heavy-armored bombers to the Army Air Forces is the intriguing story of alert aircraft engineers—the "who says it can't be done" attitude of men like George Newman.

Newman is the boyish, thirty-four-year-old Consolidated vice president in charge of the mammoth Texas plant. Half his life has been spent in aviation. He started with the organization back in 1923 when a group of far-sighted men leased the manufacturing facilities of a New Greenwich, R. I., corporation and gave birth to Consolidated Aircraft.

Since then Newman has worked in every department and knows the problems of the welder, the sheet metal worker, the riveter and the test pilot from first-hand acquaintance. He's settled two of Consolidated's big plants in mass production methods and was in the forefront of the group which defied the experts' opinion against establishing the mechanized assembly line in the aircraft industry.

HAP ARNOLD praised the production record achieved by Consolidated's Texas factory. The Army Air Forces chief is shown here on a B-24D wing, pointing to an engine connection. Also interested are (left to right) Air Marshal D. C. S. Evill of the British Air Mission; Maj. Gen. Barton K. Yount, AAF Flying Training Command chief, with headquarters at Fort Worth; and George J. Newman, Consolidated vice president in charge of production.

Assembly Line Described

The new plant is admirably suited to the production goals set by the Army. Its big factory floor is unobstructed, thanks to an architectural development enabling steel "tree form" trusses to span great distances. Fluorescent lighting in the ceiling reflects on a white cement floor designed to bounce light rays with a minimum of eye-straining shadows. Walls of the building are insulated with a three-inch layer of fiber glass and acoustics so controlled that even the hammer of rivets can't become a drowning noise re-echoing along the length of the factory.

Although figures and details are restricted wartime information, methods and manufacturing techniques in Consolidated's plant have kept pace with the physical up-to-the-minuteness of the buildings.

Raw materials go in one end and come out the other a finished plane. The magic connection is the assembly line.

(Continued on page 32)

LYNES EXPAND ON THE SOUTHWEST

In its second year of production, North American's trainer factory has installed an innovation in conveyors to increase deliveries of critically-needed AT-6's. Harold Schwedes has moved into high gear.

TRAINERS . . . .

By ANDY DeSHONG

POWER-DRIVEN conveyors, involving far-reaching developments in production technique, have been installed and placed in operation on the final assembly lines in the Texas plant of North American Aviation, Inc.

In addition, supplementary conveyor systems are being installed throughout the factory to handle subassemblies and even to move small parts throughout the factory. Completion of the system within a few weeks will mean one of the largest applications of the conveyor principle, for mass production, ever made in the aircraft industry.

Assembly Innovation

H. F. Schwedes, factory manager, described the power-driven conveyors on the final assembly floor, and the supplementary conveyor systems now in process of installation, as "the capstone for North American's mass production plan in this factory."

Installation of the conveyor system has resulted in North American's breaking up into three distinct sections, the processes formerly combined in one continuous final assembly movement.

Today, Schwedes explained, instead of continuous "final assembly", the related groups of large subassemblies are brought together on preliminary conveyor lines. Thus, the assembly of wing center section and outer wing panels is provided in one section of the conveyors. This is a distinct innovation, since the fuselage was formerly attached to the center section before the outer wing panels were mounted. The welded steel fuselage, monocoque and tail assembly are now brought together in a second section of the conveyors. At the ends of these lines, the wing assembly is transferred to a third section of the conveyors, the fuselage assembly is brought over and set in place on the wing assembly, and the revised "final" assembly begins. The virtually completed plane moves down the third set of conveyors, tail first, toward the big overhead doors at the end of the final assembly floor. From the doorway, each plane is towed out onto the flight ramp for its "maiden" or production functional flight before it is accepted by the Army and delivered to the Ferry Command.

The perfectly synchronized conveyor lines move continuously, geared to deliver a certain number of airplanes to the flight ramp in each eight-hour period. The number of planes to be delivered from the final assembly lines in any given period of time, the number of feet which a conveyor line moves per hour, and the total number of conveyors are, of course, military information which the company cannot release.

Workers Like It

Conveyor chains have been installed in the factory's concrete floor. The cradle in which each assembly rests is hooked into the chains. To simplify the problem of attaching the cradle to the conveyor chain, the fuselage assembly line and the final, or completed plane, assembly line moves forward tail first.

Schwedes reported that workers on North American's final assembly lines like the conveyor system.

"Each worker has a station on the conveyor," he explained. "Movement of the line is geared to a time schedule allowing him to complete his work before the next station is reached. The workers like the moving line because they feel they are better able to see their accomplishments as the plane moves on down the floor. And the conveyor system, with its more perfect timing, is a shortcut and a better guarantee that workers on the final assembly lines will get the subassemblies as they need them."

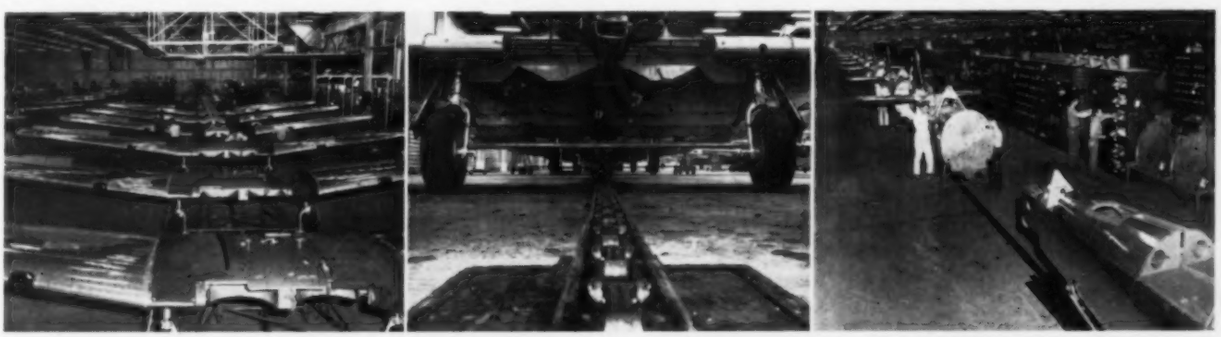
In redesigning the final assembly floor, engineers arranged continous lines of bins alongside the moving assembly lines. Small subassemblies and parts are stored in the bins, within easy reach of the worker who will be using them at the respective stations on the conveyor.

These parts and smaller subassemblies were formerly fed out from one large stockroom at the end of the final assembly floor, by means of pushcarts.

Marks Final Touch

Larger subassemblies, such as outer wing panels, the engine mount, rud-

(Continued on page 32)



ONE OF THE LARGEST applications of the conveyor system in the industry is in the Texas plant of North American Aviation. It introduces assembly of wing center sections and outer wing panels in one section, a new angle, since the fuselage was formerly attached to the center section before outer wing panels were mounted. Now AT-6 trainers for United Nations Air Forces are being delivered in greater volume.

FLYING DUTCHMEN TRAINING IN MISSISSIPPI

By BETTE BARBER

THERE'S a new note in the whrr of training ships over Mississippi, a new grimness to the hedge-hopping and spins high up in the blue. There's a perfection of step as a group of shorts-clad legs swing down the street, a gayer "Skold" when beer glasses are lifted. The Air Corps of the Netherlands East Indies has arrived and taken possession of the Jackson Air Base and won a firm place in the hearts of the townspeople.

Part of a United Nations plans to train young men from other countries with U. S. equipment, the deal between the Netherlands and the United States dropped a batch of heroes who have had many hours of combat flying, shooting down Japs and Germans. They're here to perfect their business of piloting fighting planes.

Several hundred strong, the cadets and instructors are young, between eighteen and the late twenties, and they're training ten hours daily. They have left behind their homes and possessions, and in most instances, their families in Java, Sumatra and Borneo, and they have arrived with glint in their eyes that will spell disaster for the yellow men when they return to their homeland well-trained and equipped and very determined.

General L. H. Van Oyen, in command of the force, speaking for the group, says, "We hope to get materials—modern bombers and fighters—and want to be ready to get into the war again as soon as possible to drive the Japs out of the Indies.

Speaking for the townspeople, Mayor Walter Scott says, "We like these fellows. We've liked them since the first night they got here. The first Sunday they were in town, most all of them attended church. Our folks struck up friendships with them right away."

And there you have it. A remnant of an Old World nation set down in a typical town of the Old South and the two hitting it off right away! The serious manner of the men training assures ultimate success of their plan to return and reclaim their homes.

BEARDED PILOTS from the East Indies stand inspection at Jackson, Miss.

Eating American food, wearing American uniforms with their own insignia on the lapels, and flying American planes under the direction of their seasoned combat leaders, the sight of them up in the sky is like a beacon of faith and a promise of a better future for the Allies.

TRAINERS . . .

(Continued from page 31)

ders and fins, are fed out from the subassembly departments to the points where they will be used on the conveyor lines, by means of overhead monorail and trolley systems. Completion of the auxiliary conveyor systems will mean that many smaller subassemblies and small parts will be moved throughout the plant by means of continuous overhead power-driven systems.

By setting up three distinct sections of final assembly operations—wing assembly, fuselage assembly and final assembly—North American has carried to logical conclusion, its axiom, "Don't let 'em get too big too fast," Schwedes pointed out. As a manufacturing and subassembly processes throughout the factory, breaking up operations into more and more specific, specialized jobs is one of the factors which has given the plant an outstanding production record.

North American's Dallas plant was designed and built, as a complete unit, for directional flow of production. At the time the plant was erected, it was planned to install the conveyor system at a later date. Its completion is regarded as a milestone in North American's production system, which enabled the new plant to begin delivering planes ahead of schedule, and to keep consistently ahead of contract schedule on deliveries from the date of completion of the factory.

BOMBERS . . .

(Continued from page 30)

Laid out inside the big factory building are machine shops, pattern shops, jigs in which subassemblies are built and fixtures in which the subassemblies are fitted into the plane's major components. Each unit is designed to feed the final assembly line with a minimum of time spent in hauling the subassembly to its place on the growing plane.

A forest-like arrangement of steel pipes and beams form the vertical jigs in which the center section of the B-24D's wing is built. When the last rivet has been hammered into place, a crane clinging to monorail tracks in the ceiling lifts it from the jig and carries it one step down the line. There, laid horizontally, its two ends supported on carts rolling along raised tracks, the wing picks up tubes and wires and fittings from men and women workers as it moves from station to station.

Three Major Components

A jack lifts each wing to a higher level, permitting installations on the underside at a convenient working level. Farther on the wing drops into place in a mating fixture where nose, tail and center sections of the fuselage are brought by crane from their nearby assembly points. There the three important subassemblies are bolted and riveted together and the B-24D takes shape as the great fighter it is to be.

The landing gear is added and the plane rolls a couple of stations down the line, to be picked up, set on a special cradle and turned at a 45-degree angle. This space-saving measure puts three airplanes on the assembly line where before there were two.

Then the mechanized conveyor pulls the cradled plane along while minor assembly lines feed in wing outer sections, leading edges, tail stabilizers, fins and scores of other subassemblies. Overhead cranes lift the big fourteen-cylinder engines and hold them in place while mechanics set the bolts in the motor mounts. Propellers also drop into position as if by magic. The miles of wiring and tubing for the ship's controls are strung and other installations are made by hundreds of workers. Armament is installed with exacting care, and finally plexiglass coverings for the gun turrets and bombardier's compartments are fastened down.

Another B-24D long-range heavy bomber rolls off the line.

They said it couldn't be done. Texas gives them the answer.

First photo of the new Fairchild AT-13 Crew Trainer

Fairchild's Plastic Crew Trainer

The first Duramold, ordered from the drawing boards, is "off the press." Moulded of plastic plywood, it eliminates rivets and conventional stressing. Bomber crews will train as teams in the sensational, 200-m.p.h. tricycles from Maryland.

The Fairchild AT-13, two-engined crew trainer built entirely of Duramold, except for certain members supporting the bombing, machine gun, camera and other equipment, has been successfully test-flown in Maryland. Vance Breese, well-known test-flight engineer, handled the ship on its first flight and expressed himself as delighted with its performance. Armand Thiebolt, chief engineer at Fairchild, who designed the plane, and the entire engineering staff watched the flights while in downtown Hagerstown, where twenty per cent of the employed population is engaged in building Fairchild planes. Traffic was halted at many points while men and women left automobiles at the sound of the unfamiliar engines to watch the ship many of them had worked on take its first flight.

Though details of performance are restricted, the War Department has permitted it to be stated that the ship's speed is in the 200-mile-an-hour category. With a wing span of fifty-two feet six inches, an overall length of thirty-seven feet and seven and three-eighths inches and a height, from the ground to the top of the vertical fin in flying position, of slightly over thirteen feet, the plane is one of the largest and fastest designed and built for training.

Meets Training Demands

It was built to meet the necessity of training bombing crews as a unit. It provides places for bombardier in the transparent plastic nose, pilot and co-pilot in the cockpit, navigator-radio man beneath a special navigation hatch, machine gunner in a power-driven turret, and camera man over vertical and angle camera hatches in the tail. The ship is equipped with all of the instrumentation to enable an entire training crew to simulate all of the conditions of a long-range bomber attack. As the ship is the first trainer of this type to be equipped with tricycle landing gear and is otherwise very similar to tactical types, it will enable crews thus trained together to step into actual fighting craft as a well co-ordinated team.

"If you ever saw an all-star football team go into action against a team individually its inferiors but used to playing together," said J. Carlton Ward, Jr., Fairchild's president, "you will appreciate the importance of this training for our bombing crews. Football men do a hundred yards in ten seconds. In the single second it takes an ordinary athlete to cover two stripes on a football field, your bomber and his mates are moving at a speed that covers the entire field, both end zones and ten yards more. You know it takes team co-ordination to complete a forward pass on the football field. Co-ordination, complete and instantaneous at twelve times football speed, is the only thing that makes bombing and fighting successful in passing over targets on the accurate hitting of which the course of the war may turn."

Duramold Advantages

The Army Air Forces ordered the Fairchild crew trainer in quantity from the design on the drawing board and production will proceed after the completion of flight testing of the first plane shown above. The principal characteristic of the new plane is the perfectly smooth exterior finish attained through the use of the Duramold process. It is without rivet heads or exterior fastenings of any sort with a consequent large increase in aerodynamic efficiency. The after part of the AT-13's fuselage is of true monocoque construction, all stresses being taken in the skin itself without the use of longerons or lateral stiffeners except surrounding the openings.

While the wings are of more conventional interior construction—using two spars and ribs—the wing skin is also of plywood and thermo-setting resins moulded into the necessary compound curves by the Duramold process. The wing skin itself is of sufficient thickness and consequent rigidity to maintain its true curve under flight stress with much less interior stiffening than usual and wholly without exterior fastenings, such as rivet heads or lap joints, thus eliminating drag factors which reach high values at the operating speed of such an airplane.

The entire exterior of the plane is finished in a rubbed aluminum paint with a synthetic resin base, thus giving it exteriorly the appearance of a single piece of polished metal. The interior is finished in a clear resin varnish, the fine grain of the African mahogany which forms the outer ply of the wood thus providing a pleasant subdued tone to the interior.

The only metal or other strategic material used is in the engine mounts and cowlings and in the tubular steel members on which the bomb racks, bombsight, machine guns, controls and instrumentation are mounted. The bomb bays are ample for full loads of medium size practice bombs.

THE Sky's the Limit

BY BILL GREEN

Civilian planes and parts hard to find . . . Private flying is disappearing . . . But CAP needs more pilots and planes . . . Deep water flying . . . You learn a lot over the ocean . . . Mr. Knox turns down our catapult for Culvers.

Private Flying Doomed

It is beginning to look as if private flying, as we have known it, is on its way out. There are practically no new airplanes for sale now. There are a few larger ships — used — and there is a brisk trade in them — and the prices are up. One prospective purchaser answered a good many ads in one of the plane-selling publications, only to find that all the desirable ships had been sold. Parts are getting scarce, instruments are very hard to get, propellers (metal) and propeller parts practically unobtainable.

What will finally happen? Will private flying disappear? Perhaps to a large extent it will. Priorities will get you some parts and equipment — but even some of the A-1 priorities won't get the parts and materials. Most of us can't get those priorities for our private business.

One answer is for a private owner to get into the Civil Air Patrol, and put his ship on coastal patrol, or on courier service. If you volunteer for as much as three months, you can get a good priority for such parts and equipment as you need. Ships on coastal patrol or courier service are required to have two-way radio equipment, at least 7.5 watts on the transmitter, and to have, in addition to the usual instruments, a turn-and-bank indicator, sensitive altimeter, a rate-of-climb indicator and a sweep second-hand clock. All such ships must be in good mechanical condition and must, before presenting themselves at a base, have a 100-hour check, properly certified to in their log books.

The CAP is doing yeoman work on its coastal patrol. Various magazines, newspapers, and other agencies have carried considerable information as to its operations. Suffice it to say that the CAP is looked upon with favor by our military organizations and enjoys their fullest co-operation. The CAP is composed of many hard-working, energetic, inspired patriots. They have been willing to risk their lives and equipment in flying over the ocean now for many months, in their single-engine planes.

Over-Water Patrol

We can tell you that there is an entirely new experience to be gained from flying over deep salt water. Private pilots (at least of our particular ilk) have for years detoured around large bodies of water, swamps, woods, etc. They usually have ascended to what they considered some safe altitude before deliberately crossing a dangerous stretch of terrain or water.

Not so with the coastal patrol boys. They take off, never get up to a thousand feet, take out across swamps, lakes, bays, and the ocean, without looking back. At first, and especially at first thought, the idea is terrifying. Think of the sharks; the possibility of turning over as you drop into the water with wheels down (on fixed gear ships); and the possibility that you might be knocked out on the landing —and not be able to get out of the crate before it sinks.

Never mind, one's card just comes up once, and no matter how hard you squirm, that is the end. What can you do? Nothing. So you go ahead and get the job done.

There is a job, too. We desperately need all our new fighting ships in foreign places. We haven't enough pilots or planes to do the training job we have to do—and also do a good job of coastal patrol. That is, unless we use the thousands of pilots in the CAP. And, of course, their privately-owned airplanes. We can tell you, and you know this, too, that if we do not convoy our ships safely along our coasts, with their cargoes of precious materials and equipment and supplies, that eventually we will lose them all. If we do not have enough ships to carry our men and equipment to all parts of the world, to lick the Axis, then we will inevitably be licked ourselves. To most of us, that thought is so unpleasant that we will do anything, even to flying over a lot of dismal-looking ocean.

After you have flown a bit, however, it doesn't seem so bad. In fact, if you have some company out there it is pretty good. Many times it is extremely exciting. The boys who have been out will never forget it. They want more of it. Danger is secondary. Big thing is getting the job done.

Seamen Appreciate CAP

On one job we had an interesting aftermath. A sailor told us that when they saw us circling them, they felt better and safer than they had for months. Said we looked like angels from heaven to them. He had been on another ship not long before that. Suddenly there had been an explosion and the ship was sinking beneath them. For days they were in the water, clinging to a half-sunken lifeboat. When

She should know, Bud!

—*Hughesnews.*

". . . But I'm trying to tell you, Girlie—that's the correct way to measure for pants!"

SEA RANGER is the name of Boeing's new long-range patrol bomber, a new experimental type. It has a longer range and can carry a larger bomb load than any Naval plane now in service and is powered by two huge Wright Cyclones of the largest horsepower types yet perfected.

he and his shipmates were finally rescued, and shipped out again, they expected every minute to hear another explosion and find themselves in the water. When a pilot realizes the appreciation, the deep feeling the sailors have for him, it does something. The deal is working. It's vital. It's a great satisfaction.

Suppose you are a private pilot of the ordinary mine-run class. You think you can navigate, don't you? If you start out from Dallas to Houston, you think you are doing fine if you spot Houston through the *front* windshield when you first see it. But Houston is ten miles wide. Suppose it was just a whistle buoy, about three or four feet in diameter and eight feet high. And covered with moss and barnacles just about the same color as water. And twenty-seven miles from the nearest bit of land or other fixed object. Think you could go out there, with four-mile visibility and hit it right on the nose? Well, CAP boys are doing it, day after day. But they are doing a brand of navigating new to most of them. More accuracy, more care, using clocks, slide rules, scales, protractors. It's easy, but it's new. Beechcraft and Howard pilots are letting their navigators tell them what to do. They just fly the ship, watch the air speed and compass, and they are certainly surprised at their accuracy. The navigator or observer is the main guy, now. He plots the course, determines the positions, writes the reports, turns in the reports—and is the guy who is wrong if he misses. The pilot is still captain. But he does what the observer says, as far as the navigating is concerned.

We think you would like it. We know you would be proud of your part when we have licked the Axis. Nobody will ever be ashamed of the part CAP is playing. We are sorry the whole story can't be told. Get into it and see for yourself. A lot of swell people are doing it.

Snap Judgment

Frank Knox, Secretary of the U. S. Navy, has declared that our idea, mentioned in these columns, of launching a small airplane such as a Culver from the deck of a tanker or freighter, for protection against submarines, to be "impractical and useless". Meanwhile our merchant fleet is being decimated at a rate far in excess of the building of new ships. As long as the Germans sink more of our ships than we can replace, we are losing the war. This is a war of supply lines. When we have no more supply lines, we are finished.

Incidentally, Mr. Knox, a landlubber, exposed for a short period to the influence of people who abandoned dive-bombing as impractical, but who now believe in it since the Germans and Japanese have demonstrated its effectiveness, again has set himself in direct opposition to a smart group of engineers and manufacturers who think he is just wrong. As long as we are losing ships faster than we can build them, and each of these ships, besides its own worth, is loaded to the gills with precious and in some cases, irreplaceable materials and equipment, we think nothing suggested by practical and discerning people should be willy-nilly heaved into the waste basket. It costs so little to try something like the catapult idea. All the engineering on a practical catapult was submitted to them.

Let's have catapults, guns, convoys, or something to protect our men, ships and equipment.

An Open Letter

To all Army and Navy Officers and Men, (and, incidentally, to all Government Officials and employes, including Congressmen):

We do not like the extreme rivalry that exists between many of the high ranking men of the two military services. We do not like their independence of each other—and of *us*. We do not like their unwillingness to accept new methods, and tools, and ideas.

We do not like the politics played by Congress and high government officials, which apparently is closer to their hearts than the patriotism we expect of them.

Let's get down to business. Let's look at this thing realistically. We are all set to lose this war if we don't coordinate every muscle—every ability—every machine—every person and thought, to one thing: The preservation of our American way of life. That can only be accomplished by pouring on the coal, and that means for every man, woman and child, and every dollar and machine, to be enlisted wholeheartedly, and without subterfuge, into the war effort. It means the Army, Navy, Congress, the Government, the President, and all of US.

Let's wake up—before it is too late.

Here's Good News

In August, 1939, the last month before the outbreak of hostilities in Europe, only 250 warplanes were produced in the United States. The last announced production figures prior to Mr. Roosevelt's 4,000-a-month statement, was for September, 1941, when 1,900 warplanes rolled off the aircraft industry's assembly lines. This was a 700 percent increase in twenty-four months. Yet in the next eight months, the industry more than doubled its monthly output. We produced 4,000 planes in May.

Enlist CIVIL AIR PATROL *in your*

TAYLORCRAFT'S TG-6 glider trainer is being delivered in volume to the Army Air Forces. It seats three, the instructor being able to teach two students simultaneously.

GLIDER UNIVERSITY

Nothing is simulated in the Army's finishing school for glider pilots near Amarillo. In only two weeks, students fly all kinds of motorless craft, including giant troop carriers.

NEAR Amarillo, Texas, on the flat, airy plains, is a temporary advanced glider school, one of the Army Air Forces' many glider universities. Here the student receives a finishing course which entitles him to a crack at the Axis, a pair of silver wings and a reserved seat on the ground floor of a future peacetime industry, vast and full of opportunity. Experts forecast the not-far-distant day when glider trains will rush freight and passengers across country, just as do railroad trains today.

The fledgling pilot comes here with a knowledge of the fundamentals of gliding, obtained by operating cub airplanes without benefit of motor, during their four weeks course at one of the numerous primary glider schools now in operation.

There is nothing simulated in the advanced school, however; the student pilot, in his two weeks' training, operates gliders ranging from the compact two-place jobs to giants with wing spans approaching those of the four-motored bombers and transports.

Difference Between Gliders, Planes

There are few differences between a glider and its cousin, the airplane; the principal one being, of course, the absence of a motor in the glider. Simple instruments adorn the glider's dashboard—air speed, turn and bank, and rate of climb indicators, and an altimeter. One of the most valuable accoutrements of the glider is the spoiler in the upper portion of each wing—a trap door which, when opened, breaks up the air flow, causing a loss of lift. Breaking up the air flow by use of the spoiler is known as "burbling." The glider loses altitude rapidly without loss of speed. When the spoiler is closed, the lift is regained immediately; whereas, with the use of flaps on airplanes, there is some delay in regaining the lift.

Gliders are attached to the tow plane by ropes of varying length, all dovetailing into the rope leading from the plane. The tow plane line is usually a five-eighth-inch manila rope. The first glider may be 250 feet behind the tow plane, the second 350, the third 400, etc. Thus, there is no possibility of the gliders colliding by swinging into each other laterally.

Out on the line at Sherer Field, which the students reach shortly after the sun comes up, dispatchers wait at a table, ready to enter the name, rank, time taking off and time down for each student, whose flights have been planned by the director of training and his staff.

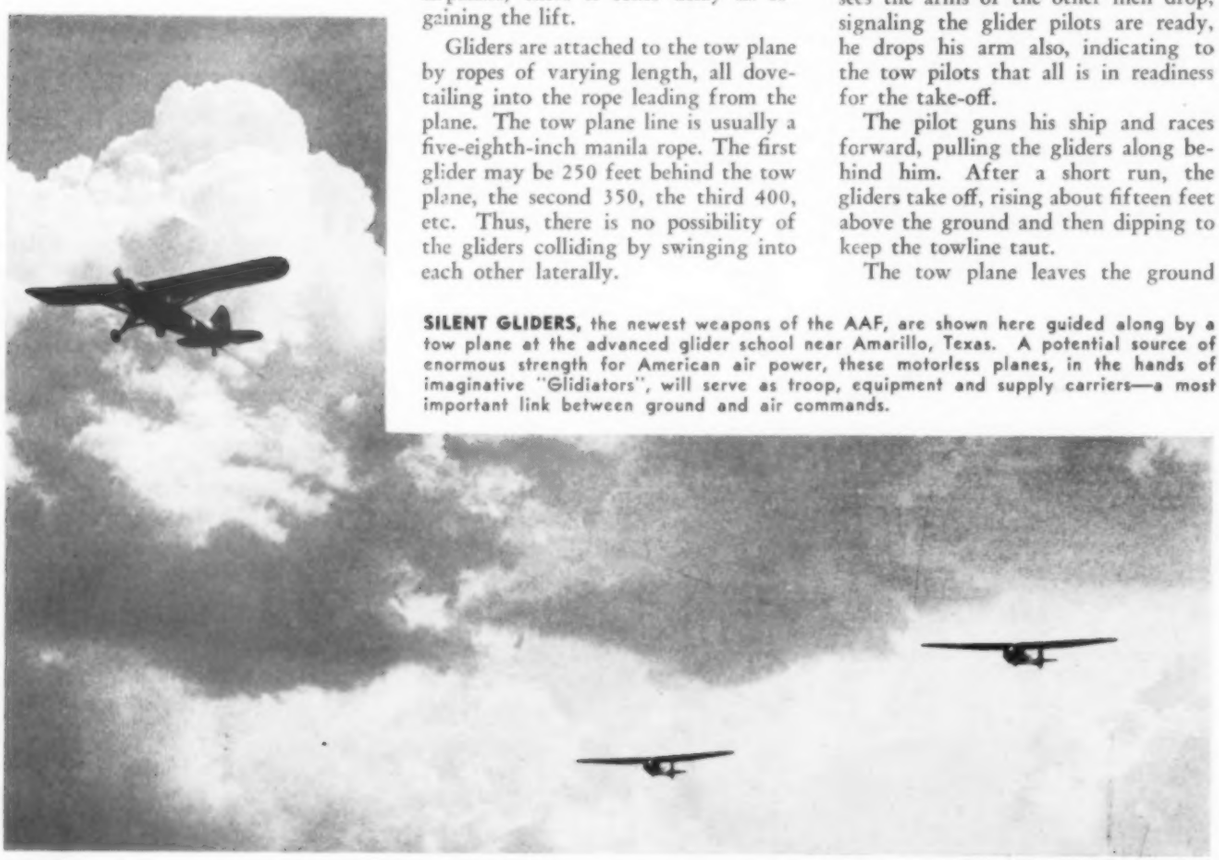
Assigned to his glider, the parachute-strapped student gets in. Enlisted men keep the glider's wings level — each glider, when at rest on its single wheel and a skid which resembles a ski, dips one wing to the ground — and holds one arm aloft.

Let's Go Aloft

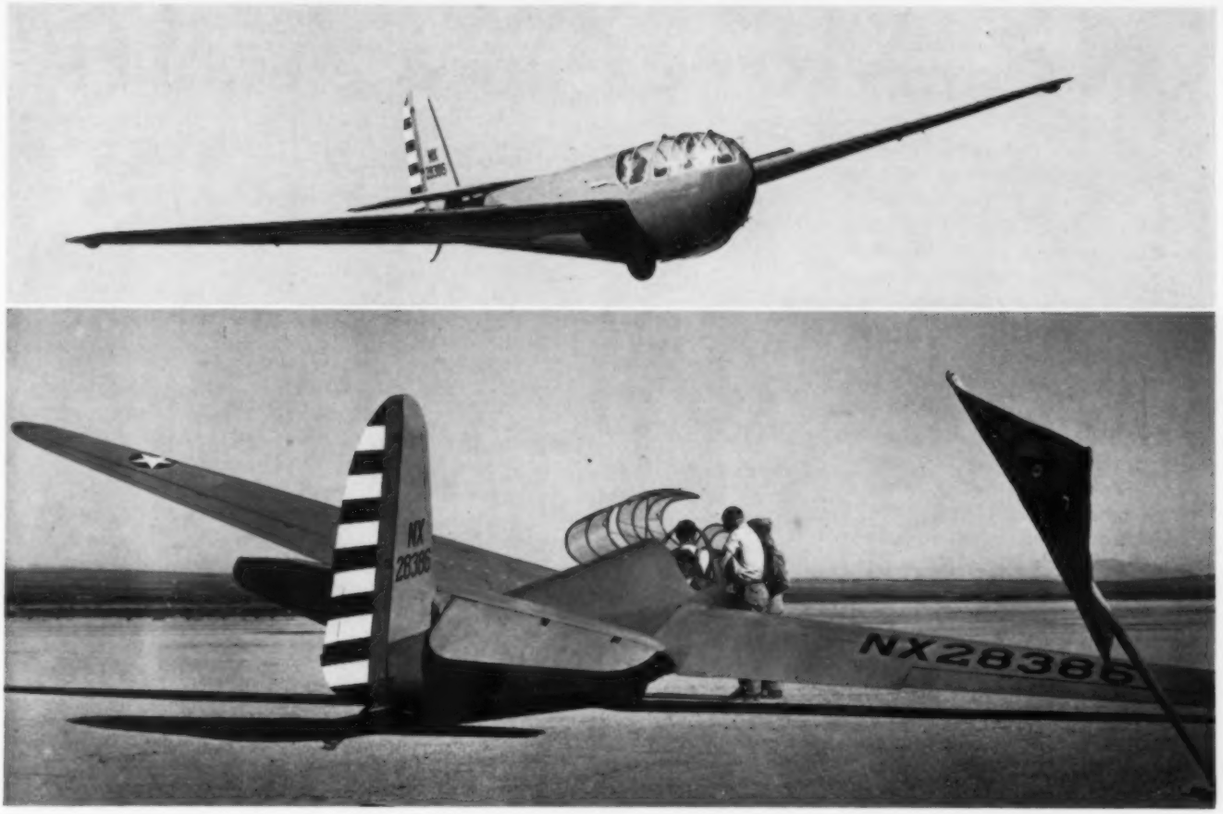
Another enlisted man stands near the tow plane, also holding an arm aloft. When the tow line is hooked up to gliders and plane, the tow pilot taxis his ship forward a few feet. When the slack has been taken up and the enlisted man near the tow plane sees the arms of the other men drop, signaling the glider pilots are ready, he drops his arm also, indicating to the tow pilots that all is in readiness for the take-off.

The pilot guns his ship and races forward, pulling the gliders along behind him. After a short run, the gliders take off, rising about fifteen feet above the ground and then dipping to keep the towline taut.

The tow plane leaves the ground



SILENT GLIDERS, the newest weapons of the AAF, are shown here guided along by a tow plane at the advanced glider school near Amarillo, Texas. A potential source of enormous strength for American air power, these motorless planes, in the hands of imaginative "Glidiators", will serve as troop, equipment and supply carriers—a most important link between ground and air commands.



First Photos of the Plastic-Plywood Bowlus Glider Trainer

BOWLUS WELDS PLYWOOD PLASTICS INTO NON-MAGNETIC GLIDER

Norman Larson, general manager of Bowlus Sailplanes, Inc., has announced successful test flights of the nation's first all plywood-plastic glider for the Army Air Forces. It is completely non-magnetic—practically free from detection by enemy listening devices.

In weight, wing-loading and speed, it more than doubles the specifications of the famous Bowlus Albatross sailplane, but it is a glider and will not be used as a sailplane. William Hawley Bowlus designed it and Paul Wildermuth did the engineering. The first one tested, shown above, is a two-place transitional trainer, but it embodies latest developments in design which will characterize the giant cargo gliders to come. Performance data is restricted.

last and gains altitude. After a short flight with slow turns, to accustom himself and the glider pilots how to "ease around a corner" without straining the ropes, the tow-pilot wig-wags the tail of his ship. That is the signal to cut loose. The glider pilot pulls the release lever. The release is a steel loop with a hook-and-eye-attachment. When the release lever is pulled, the hook flies open, releasing the glider from the tow line. The tow plane flies back over the field and drops the line to men waiting below.

The glider pilots remain aloft for as long a period of time as the man at the controls desires, or, if they are soloing, as long as the instructor has ordered.

While being towed, the glider pilots have been careful to maintain the tautness of their line, to keep out of the slipstream and the "prop wash" and to hold their position in relation to the tow plane at all times. Now on their own, they head downwind and toward the home field after practicing stalls, spins, and slips. Two men with flags stand at each end of a mythical line to which each glider pilot has been instructed to roll after landing. The tow plane already has landed and is ready to take off again.

The glider pilot comes in on a high approach, using "S" turns and slips in the same fashion that a sea gull does when it comes down almost vertically to nab a fish below. His air speed, in the small glider, is rarely faster than sixty miles an hour and he lands at about forty. He calculates how far he will roll and then picks out his landing spot and rolls up to the line. The tow line, meanwhile, has been attached to the plane again. When the glider lands, the line is hooked to it again and all is ready for another takeoff.

Glider training includes night flying, with the field outlined by smudge-pots.

Besides his seventeen and one-half hours of actual flight, the glider pilot is put through a thirty-hour ground school course, including meteorology, characteristics and flying technique of gliders, Link trainer work, communications, maintenance, and physical training.

Before he entered the glider program, the student may have been a farm boy who longingly watched planes fly over furrowed fields but never set foot in one, for many of the men now training to be pilots had no previous aerial experience. If such is the case, they are given a ten weeks course, consisting of eight weeks instruction in light airplanes, three weeks of which is with a dead-stick, and the final fortnight of training at an advanced school.

(Continued on page 39)

No More Washouts

You've heard that before. But here's a guy who can prove what he contends with actual records. Meet Mr. Joe Taff, who will show how the new instructor-training course can be handled to eliminate washouts and make better, safer pilots.

By JOE TAFF
Chief Instructor of Fort Worth Aviation School

LAST April the U. S. Army Air Corps allocated $2,000,000 to Civilian Pilot Training to give immediate training to 2,000 instructor pilots. We think this program can result, if proper supervision is given, in standardization of flight instruction methods. What's more, we think it will turn out the best instructors this country has ever seen and promote flying safety for years to come.

The original instructor refresher course, the only other attempt at standardization, misfired. Somebody on top either forgot or did not know that every aircraft pilot with several hundred hours or more would not necessarily make a good instructor. Even so, this course still would have been a good standardization medium if the inspectors had not made so many of their own private and personal interpretations of the proper execution of the various maneuvers. As a result, standardization deteriorated so that an instructor did not dare send his students up for their flight examinations without first determining which inspector was to do the examining. Some of them even expected students to make a spin recovery with the stick locked back, for which the student must take advantage of the inherent stability of the plane. This is possible in a few light planes but is dangerous—the surest road to a broken neck on higher horsepower.

Formula for an Instructor

But that's passed now. Let's go on to the new program and make the best of it. First, let's make sure what kind of men we want for instructors. The good instructor must have a pleasing personality and must be intelligent enough to talk to a student without stumbling and stuttering. He must be, more or less, a practicing psychologist. He's got to be able to mix with the boys. To break down a flight maneuver and put it back together for his student, he must have an analytical mind. He must possess character and disposition to win and hold a student's respect and his temper must be even.

Then, of course, there are certain definite requirements he must meet to enroll in the new training course. This is called the "advanced instructor's course" and is in no sense a refresher. How could it be, with those taking it having never held an instructor's rating? Here are the requirements:

1. Must have reached their twenty-first birthday but not their forty-second.
2. If between twenty-one and twenty-seven the trainee must show in affidavit form the reason for not being in cadets.
3. Army washouts accepted provided washout was not for flight reasons.
4. Must be able to pass CAA Medical Examination of Commercial Class.
5. Must have passed Commercial Physical Examination within thirty days of entrance flight check.
6. Must have Private License or better.
7. Must have at least 160 hours or better of logged certified time.
8. Must be financially able to spend full time at air school—approximately official daylight to dark for eight to ten weeks. (No outside work permitted.)
9. Men having been disqualified from other CPT courses may not enter.
10. Must sign affidavit showing willingness to complete course and upon completion to instruct in Army Aviation Contract Schools, in the Army or Navy (Course is not for ferry command).
11. Pass an interview with Flight Contractor representative.
12. Pass a pre-course flight check.

Pre-Course Check

If we take a man who fits this bill, and meets the personal requirements as to character, temper, intelligence, and such, then we've got a trainee who should go to the top. But before we open up on him with a flight check we sit down with him and have a chat. We want to be thorough, so we talk for maybe two hours, because there are lots of things we should know. Where is he from and what has been his business are the first things we ask. Then we go into his personal background, asking whether he is married or single, whether he likes fishing or hunting, and the like. Why does he want to be an instructor? What makes him think he could be a teacher? Along about then we go into his flying and learn about his experience and the kinds of planes he's used to. Naturally, we know a lot of these answers already, but by asking him personally we find out more—and we loosen him up a bit so he will talk with ease. It's surprising how much one can learn in such a chat, and if you're an old hand at the game you can just about size up a *real* pilot without ever going up.

The flight check, as it goes, is generally a dizzy affair anyway. And before we get through with our talk the trainee wants to know all the answers. We can't tell them on the ground, and a sensible person can't blame us for this, but we've been called unfair lots of times. The check runs from forty minutes to an hour. In this time we give the student part or all of the maneuvers. And it may surprise many to know that we are really human in the test. Long before this course started we realized we couldn't grade a man on eights, chandelles or field patterns when he has not practiced them from sixty to one hundred hours. But—we do know that while a man is attempting to do maneuvers we can find such things as good co-ordination, which, whether polished or not, can be corrected with a little effort. It is surprising how a man's flying aptitude will show up in a chandelle or lazy eight.

Facts — Not Theory

On the other hand, it is obvious that a man who will spin out of a chandelle time after time could never conquer an immelman in the time allowed by the course. One pilot who took the pre-course check was going along pretty good, but there was something which told us to look closer. Finally we altered the maneuvers just a little bit. Right off he came apart at the seams and showed his weakness. The trouble? He was a "by-the-book" pilot. As long as he could plan ahead a little way he was okay. But in a pinch, when things came a little faster

than his book-sense could follow, he blew up and made every mistake possible to make. Now I ask you, were we unfair with him? Whatever your view you will have to admit there is something to our record of having *absolutely no washouts*. I believe this system is better than taking a man in and *then* washing him out on the fifteen hour check. Once he enters the course and is washed out he is disqualified for good. On the other hand he can go back after missing the pre-course check and find out what's wrong, correct it, and try again. Even if he misses the second time, and the third, he'll be a better pilot. After the check we go back to the office and talk again, checking the blunders and showing the trainee how to correct them.

We have set up a very thorough course at the Fort Worth Aviation School. It has four stages—A, B-1, B-2 and C, making a total of fifty hours minimum and sixty hours maximum. If there's a better set-up I'd like to know about it.

How We Do It

The first fifteen hours are on an S-1A Interstate Cadet trainer of sixty-five horsepower. During this time the trainee is familiarized with maneuvers as far up the scale as chandelles and lazy eights. Meanwhile he is under constant observation in the air and on the ground and he must demonstrate at all times that he can conduct himself as an instructor when not flying. Different instructors lecture to him on cockpit manners, log book grading and how to break bad flying habits as well as how to correct them. In fact, he receives more time on instruction lectures than in preparation for his commercial and instructor's written.

Back in the air he runs into something which is unexpected. We have some of the Interstates purposely out of rig. Sometimes we bend the rudder tails and the trainee must perform just as well under left rudder pressure as he would normally. Then, too, we see that the trainee doesn't fly the same Interstate more than once a week, keeping them rotating among nine of the Cadets. This is just one more way we make sure that our graduate can fly any ship with any horsepower rating and do a good job of it.

The fifteenth lesson is a check ride. Most schools frighten their students by calling this the "washout ride." We don't agree. If a student passes our pre-course interview and check ride we *know* he will finish the course. Our students know it, too.

Impossible to Bust

The second stage, B-1, is in the Ryan St-A and here the chandelles and lazy eights are made more difficult. Thus we strengthen the student's confidence in acrobatics. Our instructors continue their lectures. Before long the student begins to grade his own flight sheet, not only for practice but to give his instructor an opportunity to observe how good a student thinks he is. When a trainee starts giving himself unusually high grades we know he's headed for cockiness, self-satisfaction and mental or physical goldbricking. So we get a head start and go to work.

Eight hours of night flying comprise stage B-2. It is entirely local flying and includes field patterns, various kinds of landings and radio work. Everybody is on his toes because it is here that a student becomes conscious of his instruments and their importance. The two hours of dual and three hours of solo are given in a ninety-horse Stinson Voyager. On the ground he still receives his lectures, with emphasis on forced landings at night, use of flares and radio.

For the final stage, C, we introduce a new type trainer, the 220-h.p. plastic Timm. In this brush-up stage the student actually instructs the instructor. He does his best to find mistakes in the instructor's flying and to give the proper error correction. How's that for double-checking? Then, too, the instructor bears down to prepare the student within the next ten hours for his commercial and instructor's flight examination.

Pass? They *can't* bust after going this far. That's what our record says. *Not a single one of our trainees has washed out.*

So we can thank our stars for the new instructor's training course. We'll be better pilots the rest of our lives as a result.

★ ★ ★

GLIDER UNIVERSITY

(Continued from page 37)

Men who have flown before are trained for a month at a pre-glider school before coming here for their two weeks' work with the real McCoy.

Because of the necessity of swift action, glider schools send their students through training as intensive as can be devised without loss of effectiveness. Every day is full, from reveille at dawn — sometimes before dawn — to lights out at nine or ten.

In ground school, the pre-glider student learns to identify flying conditions from maps as well as the sky; he studies cloud formations and knows how to select the friendly cumulus cloud which attracts a stream of air upon which he may rise to the heights; he learns that a compass points not to the true north, but to the magnetic north on Canada's Boothia Peninsula.

The student undergoes a rigid disciplinary system, learning how to be a good soldier or officer as well as how to handle a glider. He drills, marches to formations, keeps his quarters in apple-pie order. A physical instructor leads students in exercises to test and improve co-ordination and develop muscular prowess, and stages friendly competitions which mitigate the strenuousness of the brief course.

While one group of pre-glider students is attending ground school, another is flying.

The cubs are taken up through motored power, but once aloft, the ignition is turned off and the gliding begins. The student has been told before taking off exactly where he should land, and when he comes down in an effort to accomplish his mission, he does exactly what every cadet at powered flight schools are warned not to do—he "slips." The slip, of which every power pilot is wary, is meat and bread to the glider pilot. It enables him to come down almost vertically on the objective.

At the conclusion of his training, the glider pilot is ready to report to the troop carrier command, which will give him a larger objective: the opportunity to visit certain countries and occupied territories abroad, but not as a tourist.

★ ★ ★

Safety and Overcasts

A collision takes two airplanes out of the war effort and may involve many lives. Flying in overcasts increases the danger of collision. Help the war effort:

1. Stay out of overcasts unless you have an instrument rating;
2. Don't practice instrument flying in an overcast unless you have filed a flight plan and adhere to it strictly;
3. Don't fly adjacent to top or bottom of overcast, especially a ragged one—some other ship may be ascending or descending through it.

Ryan at Tucson

The Ryan School of Aeronautics at San Diego, California, has established a new Air Force primary pilot school near Tucson, Arizona. Ryan was one of the first nine civilian schools selected to train military pilots.

No Bottleneck In Propellers

Propellers must be perfect, their intricate mechanism flawless. That's the only way Uncle Sam makes them. An observant girl reporter reminds us not to overlook the "Connecticut Front", where artisans have outdone themselves to Keep 'Em Flying on a world-wide scale.

By ESTHER H. FORBES

WORKING together in one factory, on one floor and under one roof in East Hartford, Connecticut, are men and machines that are making every current type of Hamilton Standard propeller—the greatest range in the world. Yet this propeller center of the universe occupies less than 400,000 square feet of floor space.

As orders have doubled, redoubled and doubled again since 1939, Hamilton Standard propellers, one of the three divisions of United Aircraft Corporation, has continually had to install new specialized high-speed machinery. To provide for some of this machinery, the company has twice enlarged the plant. It has made room for the rest by the simple method of placing the existing machines closer together, so that they are now as compact as is expedient and safe. The management has found that this procedure has not only saved time and money but has boosted the spirit of the workers and actually increased the plant's efficiency. The production per square foot is probably the greatest in the country.

War Problems Solved

Typical of the wartime problems which are constantly confronting Arvid Nelson, factory manager, is that created in May when the government ordered that propeller blades be painted black for camouflage purposes. All Hamilton Standard propellers are made of an aluminum alloy which, unless dulled, is highly reflective. To achieve a smooth, lustrous finish is a work of great skill, of which the Hamilton craftsmen have long been proud. Today their work is as important as ever for assuring perfect balance for the blades although its visible effects are obscured.

Mr. Nelson has solved the problem by drafting the right rear corner of the factory for painting. The blades are suspended by hooks from a cable which moves slowly from one painter to the other. The first painter sprays each blade with an undercoat of yellow and the tip with a coat of orange paint. As he sprays, he faces a continual stream of running water — a man-made waterfall — which absorbs the paint fumes and catches the unused pigment, which is later precipitated and recovered to be used again. When the paint is dry, the second painter covers the orange tip with black material and sprays the blade with black paint against another waterfall. The purpose in making the tip orange is to make the blades visible from the ground so that service men will not walk into them while they are whirring around.

PAINTED PROPS must be dulled for invisibility, but orange-tipped for safety. H-S solved this puzzle with special spray booth, through which blades are speedily conveyed.

BENT BLADES are reconditioned where possible. Britain's DeHavilland sends back to war 80 per cent of damaged H-S props returned for repairs.

Another wartime demand is for a repair shop where blades damaged in combat can be repaired for further use on the fighting front. The reshaping of blades which have been bent is a comparatively easy process and is 100 per cent successful in all but extreme cases. Because the Hamilton Standard blades are made of solid Duralumin, even those with bullet holes can be repaired. War experience shows that more than 80 per cent can be restored to their pristine beauty and efficiency.

Hamilton Standard receives its raw materials — blade forgings, domes, cylinders, pistons — from scores of subcontractors. These come in through the front of the factory, where they undergo inspection for the Navy before being released to the rest of the plant for machining. Incidentally, it was through the efforts of the Hamilton Standard management that the Army and Navy first agreed on common standards of inspection. The parts then progress through machining and finishing to another inspection line at the rear of the shop before they are assembled.

Hand Polishing Necessary

Hamilton Standard propellers have consistently arrived at the aircraft manufacturers on time.

To make a propeller probably requires more skill than to make any other aircraft part. Each blade must be polished by hand until it balances perfectly both vertically and horizontally. The preliminary rough polishing is done by the less-experienced workers. As a man becomes more adept, he is put on a job requiring more precision. Only a few ever do the final polishing. To the visitor this appears to be the most skilled job because the man must polish and finish without removing any metal. One of the greatest difficulties that Sidney A.

THE ARMY'S FASTEST goes through its paces for the Army cameraman. This is one of the first flight views of the Republic P-47 Thunderbolt being produced for the United States Army Air Forces by Republic Aviation Corporation. Powered by a Pratt & Whitney 2,000-horsepower engine, equipped with a turbo-supercharger, and heavily armed and armored, the Thunderbolt is considered the fastest and most powerful high-altitude fighter in the sky today. The Thunderbolt was designed by Alexander Kartveli, Republic Aviation Vice President and Chief Engineer.

Stewart, general manager, has had in starting new factories and in teaching other companies to make Hamilton Standard propellers is that of finding men skilled enough to do the final polishing.

Until less than two years ago all Hamilton Standard propellers in the United States were assembled only at the East Hartford factory, although many subcontractors were co-operating in making propeller parts. Finally in 1940 the orders became too large for one factory to handle alone. Therefore, the management decided to start another propeller blade and assembly plant. Rather than spend the time, money and materials to erect a new plant, the management leased an idle cotton mill in Pawcatuck, Connecticut, renovated it and installed the necessary equipment. Within five months this plant was making shipments of finished propellers. Since then Hamilton Standard has leased other factories in Connecticut.

Constant Research

Foreseeing an increasing demand for propellers and wishing to have the country prepared to meet this demand, Hamilton Standard also enlisted the productive capacities of automotive and other industries to make complete propellers. To Nash-Kelvinator, to Frigidaire and to Remington-Rand they gave their designs, specifications and even technicians without profit. Today these companies are producing Hamilton Standard propellers for use on hundreds of our combat planes.

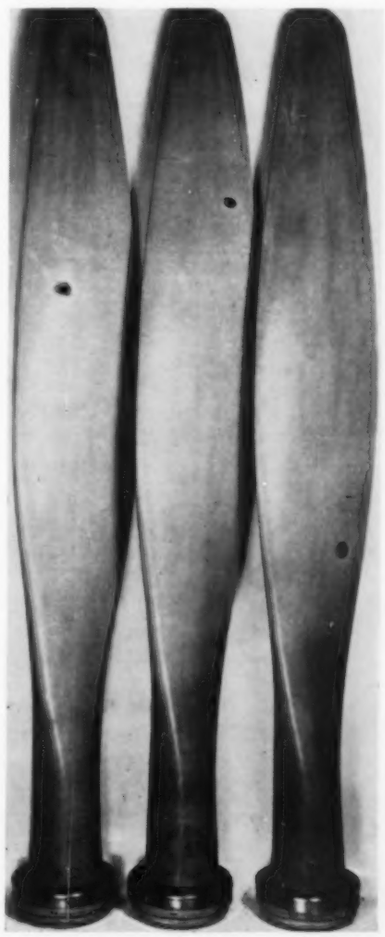
The contribution of Hamilton Standard propellers to aviation in the field of research has been tremendous. Its engineers early introduced the metal propeller, then the adjustable pitch propeller. Later they perfected the controllable pitch propeller, which won the Collier Trophy in 1933 as the year's most valuable contribution to aviation. An improvement of the principle was their constant-speed propeller, which automatically regulates the pitch to use the full power of the engine under all flight conditions. The newest of their developments is the Hamilton Standard hydromatic propeller. Its importance lies in the fact that, if the engine is not working properly, the pilot can within ten seconds completely feather the blades so that they and, in turn, the engine will stop, making the efficiency of the other engines greater and contributing much to safety.

Both the constant-speed and the hydromatic propellers are being produced at East Hartford. They range in diameter from seven to seventeen feet. In addition to making two-bladed propellers for smaller planes, including many of our basic and advanced trainers, and three-bladed propellers for larger planes, Hamilton Standard is now making a four-bladed propeller to absorb the tremendous energy of the 2,000-horsepower Double Wasp which is going into some of our latest and most deadly combat planes. The propeller builder, who provides the means for transforming the airplane from a mass of metal and fabric into a dynamic and deadly machine of war, must plan ahead and design ahead of everyone.

H-S Props on All Fronts

One of the fascinations of going through the Hamilton Standard factory is in looking at a propeller under construction and wondering where it will be six weeks hence. Hamilton Standard propellers constitute a majority of all American-made propellers. They are standard equipment on every DC-3, whether sold to airlines here or abroad or used on cargo or troop ships by the Army. They propel most of our bombers, which are achieving successes for the United Nations all over the world—in bombing Japan, Germany and Rumania—in blasting the Japanese navy all over the Pacific Ocean as in the Coral Sea and at Midway—in rescuing thousands of people from Burma. A large proportion of our pursuit and fighter planes also are equipped with Hamilton Standard propellers, which can "take it" in the sub-zero temperatures of the stratosphere. They truly cover the world.

The men of Hamilton Standard are well aware of the importance and significance of their work. As a continual reminder to "keep 'em flying" are small signs which they have posted where they can see them as they work. With the imagination which is characteristic of the aviation industry, they must continually ask themselves where the propellers they are working on today will be in a few months. Launching an attack on a second front in Europe? Or leading an invasion of Japan?



BULLET HOLES call for simple repair work, needing only to be faired out in a way to eliminate sharp edges. Still in balance, they go back to the wars.

Your Industry

Council Elects Donald Douglas as President

At the July board meeting of the Aircraft War Production Council, Inc., in Los Angeles, directors unanimously elected Donald W. Douglas, president of Douglas Aircraft Company, as president, succeeding Richard W. Millar, who resigned the Council post after stepping out at Vultee, where he was president. The Council elected Harry Woodhead, president of Consolidated Aircraft Corporation, as vice president, the post formerly held by Douglas.

Boeing Builds Gliders

J. E. Schaefer, vice president and Wichita Division general manager of the Boeing Aircraft Company, has announced that Boeing plants are now in quantity production of large troop transport gliders for the Army Air Forces. No details were given.

Aircraft Standards Unit Meets in Washington

At their seventh bi-monthly meeting, July 8-9, in Washington, D. C., members of the executive board of the National Aircraft Standards Committee discussed numerous phases of the government and industrial standardization programs with Army, Navy and WPB officials.

Board members attending were John Cramer, Boeing, Seattle; J. B. Wassall, Vega; J. T. Thompson, Martin; E. E. Miller, Fleetwings; C. T. Torresen, North American; and J. T. Gray and E. W. Norris, Aeronautical Chamber of Commerce.

Heinz in Aircraft Work

The H. J. Heinz Company of Pittsburgh, food packing firm of "57 Varieties" fame, is converting part of its facilities for production of plywood aircraft products.

PRODUCTION STRATEGISTS of the Aircraft War Production Council are constantly increasing warplane output by pooling their talents. Left to right, are: Seated—Jack Pierson, Douglas; John Demarce, Consolidated; E. Malloy, Ryan; C. Sharpe, Vultee; J. J. Fluck, North American; C. C. Hilliard, Douglas. Standing—R. A. Lawson, Vultee; Harris MacIntosh, Vega; George Pruden, Vega; R. R. Nolan, Northrop; Paul Buckner, Northrop; L. H. Provost, Douglas; T. O. Heydenfeldt, North American; G. E. Barton, Ryan; and J. E. Young, Douglas.

Texas Section of SAE Elects Guiberson, Schwedes and Fuller

Eighty odd representatives of Texas aircraft plants on July 11 elected Allen Guiberson, executive vice president of Guiberson Diesel Engine Company, Dallas, chairman; Harold Schwedes, factory manager of the North American Aviation, Inc., of Texas, Dallas, vice chairman, and W. G. Fuller, factory manager of Globe Aircraft Company in Ft. Worth, secretary, and completed plans for a meeting August 2 at which organization of the Texas Section of the Society of Automotive Engineers was effected. The speaker was A. T. Colwell, president of Thompson Aircraft Products Company, Cleveland, Ohio. The unit will be the first SAE Section to be organized south of the Mason-Dixon Line, significantly attesting to the increasing importance of the Texas Aircraft industry in the national production effort.

A feature of the meeting at which the officers were elected was an address by B. J. Robertson, professor of mechanical and aeronautical engineering at the University of Minnesota, who emphasized the value of SAE to the industry and to the individuals, also.

Those attending included:

North American—Ray A. Liming, G. W. Wilkinson, Mike Hollander, Sidney E. McKennon, Kurt Carlson, Howard F. Schmidt, Thomas J. Huggins, Jr., Frank C. Siminger, Jack D. O'Brien, Robert H. Kemp, Harry C. Mengert, W. W. Davidson, Robert E. White, R. E. Bowen, Jim B. Childers, L. A. Childs, Jr., Edwin B. Stickle, Warren A. Bratfisch, Edward Kindelberger, Jr., Walter H. Wayman, Raymond F. Martin, T. H. Beck, Ross A. Peterson, and Richard G. Bohannon.

Guiberson Diesel Engine Co.—Harry A. Sheridan, Fred H. Lockwood, William E. Lind, Wayne C. Hunt, Eli Shapiro, Otto Henke, F. C. Pettitt, R. Mangold, Murrell Adams, J. M. Nixon, Carl Brockman, J. P. Zimmerle, E. F. McDaniel, William Crawford, Clyde E. Adams.

Consolidated Aircraft Co.—H. W. Marsh, Lloyd Halpenny, J. E. Pace, J. A. Kosek, John H. Stuck, Robert Saks, B. C. Switzer.

Globe Aircraft Co.—John M. Luther, Edwin H. Jackson, Hy Epstein, W. Schmitz, and Water M. Davies.

Southern Aircraft Co.—E. M. Johnson.

Other SAE Members—Earl L. Casey, Geophysical Service; Elbert D. Helm, Texas & Pacific Coal and Oil Co.; G. E. Voglesong, Bendix Products; Floyd Patras, Southwest Greyhound; W. S. Fortney, United Motors Service; J. C. Slonneger, Continental Supply Co.; S. V. Jay, Humble Oil Co., and Wm. F. Nicol, Braniff Airlines.

Texas A. & M.—Robert M. Pinkerton, William Truettner, Howard W. Barlow, Gibb Gilchrist, and Ed. L. Williams.

University of Minnesota—B. J. Robertson.

Southern Methodist University — Andrew Hildebrand and Roy M. Matson.

University of Texas—John W. Bowman and M. J. Thompson.

Guests—B. Franklin Varney, Werner Henke, Jas. M. Dodson, L. R. Gignilliah, and James A. Trail.

New Factory for Continental Engines

A new facilities contract calling for a large new plant for the volume production of aircraft engines has been awarded the Continental Aviation and Engineering Corporation of Detroit, according to C. J. Reese, president. It will be located "somewhere in Michigan."

MORGAN McKECHNIE TILLINGHAST

PERSONAL NOTES

• W. D. MORGAN has been appointed treasurer of the Garrett Corporation, it was announced by J. C. Garrett, president. Entire facilities of the Garrett Corporation are being devoted to the war effort through its divisions —Airsupply Co., Garrett Supply Co., and Ai-Research Manufacturing Co. MORGAN formerly was assistant manager of the Los Angeles office of Ernst and Ernst, certified public accountants.

• Appointment of CITOR A. McKECHNIE as plant manager of the New Jersey plants of Curtiss-Wright Corporation's Propeller Division has been announced by Robert L. Earle, vice president and general manager of that division. Formerly with James & Roach, Inc., consulting engineers, he will make his offices in the divisional headquarters at Caldwell, N. J.

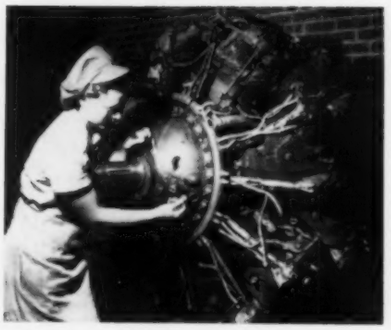
• T. E. TILLINGHAST has been elected vice president and director of the United Aircraft Service Corporation, a subsidiary of United Aircraft Corporation. He came to United Aircraft in 1929, resigning as a U. S. Air Corps captain after twelve years of Army service, to become executive engineer of Pratt & Whitney and later sales manager, a position which he will retain.

ARTHUR L. NELSON, assistant chief engineer of the Kansas City division of Aircraft Accessories Corporation, has been elevated to the position of chief engineer. . . . IRA J. SNADER, division manager of the Republic Aircraft Products division of the Aviation Corporation, has been made vice president of manufacturing. He will be succeeded at Republic by STERLING B. WITHINGTON, formerly general manager of the Brunswick-Balke-Collender Company.

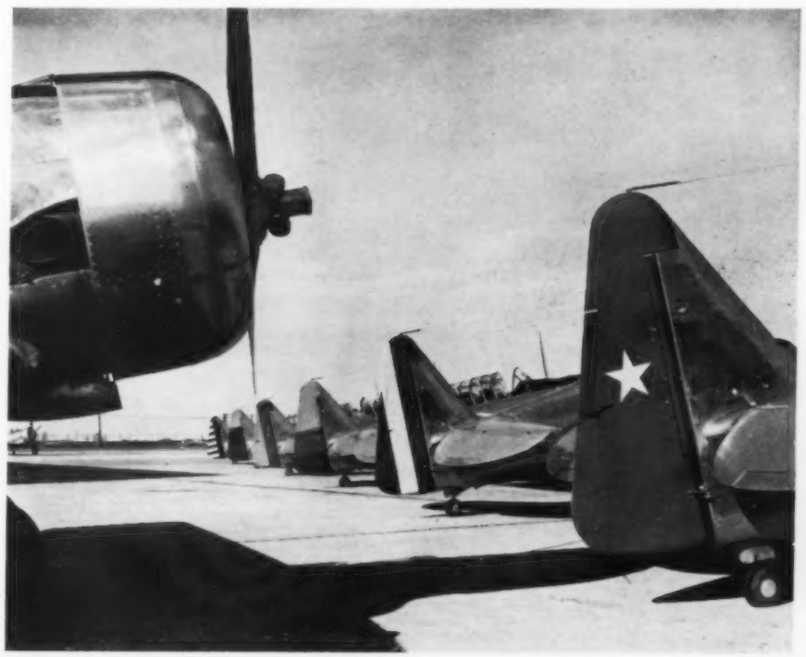
Appointment of CARL L. SHOTTER as personnel manager for the Newark division has been announced by Edward J. Walsh, personnel director of Brewster Aeronautical Corporation. He succeeds Robert Cone, who is now personnel manager of the main Brewster assembly plant at Johnsville, Pa. . . . J. Carlton Ward, Jr., president, has announced appointment of WEBB WILSON, formerly officer of the Guaranty Company of New York and more recently an executive of Smith, Barney & Co., as treasurer of the Fairchild Engine and Airplane Corporation, and that of William H. Schwebel as comptroller and secretary of the corporation. The latter has been with Fairchild for sixteen years.

W. H. EATON, JR., general sales manager of Shell Oil Company, on military leave of absence, has been commissioned a captain with flying status in the U. S. Army Air Corps and is stationed at Maxwell Field, Alabama. He formerly covered the area of Alabama, Arkansas, Georgia, Florida, Louisiana, Mississippi, Tennessee and Texas by air as division manager for marketing. . . . WILLIAM B. GRIESE, plant manager of the Lycoming division of the Aviation Corporation, has been made plant manager of the company's new Liquid Cooled Engine Division.

ASA ROUNTREE, JR., state director of aeronautics for Alabama, has been called into service and has reported to headquarters of the Fourth Army Corps Area at Atlanta, Ga. ROBERT L. CLARKSON, New York banker and chairman of the board of the American Express Company, has been elected a member of the board of directors of Republic Aviation Corporation. . . . The appointment of NICHOLAS LAURENZANA, veteran Braniff Airways captain, to the post of assistant chief pilot has been announced by R. C. Shrader, Braniff vice president in charge of operations.



BULLET HOLES didn't stop this Wright Cyclone from bringing a shell-torn Boston back from a daylight raid on France, even though the other engine was shot away, its bombardiers and gunners killed and its pilot so badly wounded he died on landing. Bullets riddled the cylinder head fins, completely pierced one cylinder, battered the supercharger housing and shot away one magneto—but it still ran well enough to cross the English Channel.



Six countries are represented by the planes shown lined up on the flight ramp of the North American Aviation, Incorporated's Texas plant. Left to right are planes destined for the U. S. Army, Venezuela, Brazil, Ecuador, Peru and Chile. The ships are part of a large group which were recently delivered to South America by the U. S. Army Air Forces.

Here's What Teamwork Means to Planesmen

Interchanged engineering reports and materiel by the eight major aircraft manufacturers forming the Aircraft War Production Council resulted in avoiding 1860 potential "bottlenecks."

A breakdown of the exchanges showed that Consolidated, Douglas, Lockheed, North American, Northrop, Ryan, Vega and Vultee "swapped" on the following scale: 15,390 pounds of rivets, 2,800 cotter pins, 9,889 bolts, 42,605 nuts, 26,459 screws, 2,000 feet webbing, 551 turnbuckles, 900 bushings, 3,400 feet conduit wire, 3,310 bearings, 300 welding rod electrodes, 2,000 nut plates, 60 spiral drills, 17,983 feet copper tubing, 3,520 gaskets, 460 speed controls, 8,530 feet brass wire, 8,400 shaft assemblies, 9,015 fixed cowl components, 6,567 feet steel bar, 6 motors, 6,100 feet zinc chromate tape, 42 castings, 2,000 pounds sheet steel, 1,402 feet steel tubing, 25,000 feet electric cable and hundreds of other items vital to continuous production.

AIRLINES

In the consolidation of Army ferrying and transport operations, the Ferrying Command has been redesignated the "Air Transport Command" and has taken over the personnel and air transportation priorities functions formerly conducted by the Air Division of the Transportation Service, Services of Supply, and the personnel and operations of the Cargo Division, Air Service Command. Brig. Gen. Harold L. George is in command.

Pan-American Airways and its branch lines are performing yeoman service in emergency operations, especially in the Gulf of Mexico region. One of six emergency flights carried twenty-one survivors of a torpedoed Norwegian vessel from Merida, Yucatan, to New Orleans where new ships awaited to be taken to sea.

A seven per cent increase in revenue passenger miles for the first six months of 1942 has been reported by United Air Lines, which gave 115,937,321 as the total revenue passenger miles for the period. Air mail and cargo increased considerably, Harold Crary, vice president in charge of traffic, said.

Delta Air Lines has reported revenue passenger miles during the first six months of 1942 totaled 16,338,965, compared with 8,219,546 for the first half of 1941, a gain of 98.78 per cent. Delta's total business has shown a steady increase every month for sixty consecutive months, commented C. E. Woolman, vice president and general manager.

Enlist in your CIVIL AIR PATROL

Proposed Taxes Would Ruin Parts Makers, Frost Tells Senate

Aircraft parts makers cannot stay in business if they have to comply with the proposed excess profits tax plan, Jack Frost, executive secretary of the Aircraft Parts Manufacturers' Association, has informed the Senate.

He sent the following telegram to Senator George:

"This association represents over one hundred aircraft parts processing companies, employing fifty thousand, all engaged in war production. Many of these companies cannot survive and production suffers if proposed excess profits taxation accepted.

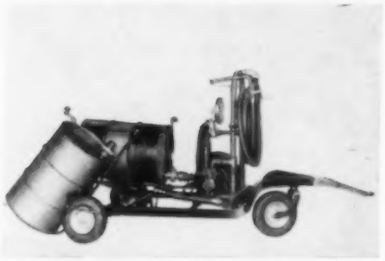
"Typical company produces ten times invested capital important aircraft production each year. Base period experience clause useless to many who were losing money that period developing products which now are essential.

"Under these circumstances, intelligent management will earn the ten thousand dollars exemption plus eight per cent capital within first month. If profits from remaining millions of production are taxed ninety per cent excess, forty per cent normal plus state and local with inherent risk in any such business, it would be necessary profit fifty per cent gross on sales or one hundred per cent on cost to result less than three per cent net on sales.

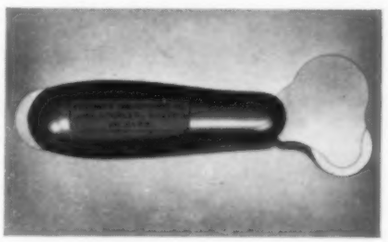
"Where will business and capital come from under these conditions?

"We are speaking now of small business, particularly subcontractors who definitely are not government financed.

"Would appreciate this being read to committee for consideration as small business rarely is represented in Washington."



LUBE-A-PLANE, by Harman, is a portable field service unit designed to pump and meter motor oil directly from original refinery barrels. Full data available from Harman Equipment Co., 937 Santa Fe Ave., Los Angeles, California.



THREE SIZES of Dzus fasteners are operated by this new single driver through a novel arrangement of varying body thicknesses. The handy tool is of cadmium-plated, heat-treated chrome-moly steel with handle of non-breakable, shock-resistant plastic. It was perfected by Products Engineering Company, 700 East Florence Ave., Los Angeles, Calif.

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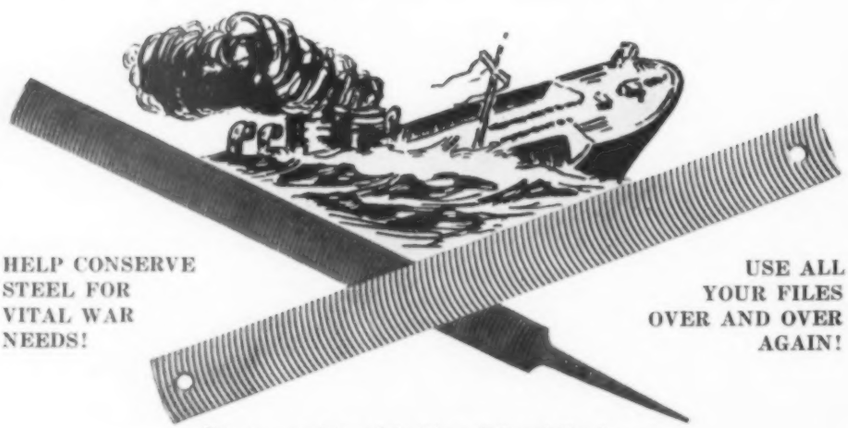

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Consair Notes

Dennis Newman, twenty-seven-year old brother of George J. Newman, vice president in charge of Consolidated's Texas factory, has been reported "missing in action" with the Royal Canadian Air Force. Newman, who enlisted as an RCAF bomber pilot in 1940, had recently cabled home that he was transferring "East" and it was believed he had entered combat on the Libyan front.

A 500-unit housing project, costing $1,250,000, is expected to get under way soon near the plant. The War Production Board gave the job an A-1-J priority rating, which will hasten construction of the demountable homes, each housing four families in apartments containing a living room, dining room, bath, kitchen and one or two bedrooms.

A new 2,500-ton hydraulic press has been placed in operation to speed B-24-D production. It is one of the largest presses in the industry and was built to Consolidated specifications.

CROSIER

Col. Lynn Chu, attached to the Chinese embassy in Washington, was a recent visitor. . . . Officers of the newly-organized Foremen's Club are Gene Crosier, president; Hap Rutherford, vice president; Frank Heidemann, treasurer, and Don Rasmussen, secretary. . . . A B-24 recently crossed the Atlantic Ocean five times in nine days with the same civilian crew. It was on freight-passenger duty.

Free Course Attracts Workers for Martin

At the request of Glenn L. Martin, the University of Maryland has scheduled a tuition-free course in aircraft material and inspection, consisting of 320 hours. On the first day thirty persons signed up for the course. Their ages ranged from eighteen to seventy-three. Students completing the course were assured employment by Martin.

Pan-Am Navigation Moves

Pan-American Navigation Service, formerly located at the Metropolitan Airport, Van Nuys, has moved to its own building at 12021 Ventura Boulevard, North Hollywood, California, adjacent to Republic Studios. The new location will provide specially constructed class rooms for celestial navigation students and administration offices.

BRIEFS

SPERRY GYROSCOPE COMPANY plants have received one of the first joint Army-Navy Production Awards, with formal presentation coming up. A special flag will be flown over all the company's plants and each individual in the plants will wear a special lapel pin.

Bomber part testing has been speeded 400 per cent by BREWSTER AERONAUTICAL CORPORATION engineers by using a device known as a "Comparator" operated in connection with a Rockwell Hardness Gauge, according to the Compressed Air Institute, which will furnish full particulars to those interested.

The RYAN AERONAUTICAL COMPANY has delivered a large number of Ryan ST-3 primary trainers from its San Diego factory to Jackson, Miss., for the Netherlands East Indies Army Air Force, which has a training base there. The Dutchmen also will receive a considerable number of Ryan PT-22's on transfer from U. S. Air Forces units to speed instruction.

In one day recently, the BENDIX AVIATION CORPORATION'S radio division at Baltimore shipped a million dollars' worth of radio equipment to the military services. June output was forty times the volume of two years ago. Factory Manager Foster was praised by President E. R. Breech in a telegram to Division Manager Hugh Benet.

Aeronca Installs Conveyor

A monorail conveyor system, utilizing reject raw materials on hand, has been installed by the Aeronca Aircraft Corporation at Middletown, Ohio, to speed production of L-3-B liaison airplanes for the Army. A specially-designed carrier holds the fuselages rigid for welding, fairing or installation work and permits the fuselages to rotate so that work can be done on all sides of the ship without cramping the workers.

New Literature

An important and timely folder has been published by Littelfuse, Incorporated, 4763 Ravenswood Ave., Chicago, Ill., and 233 Ong Street, El Monte, California, furnishing a compendium for technical as well as general information on the new Littelfuse Beryllium Copper Fuse Clips and Screw Terminals. Copies may be obtained by writing to the firm.

Price reductions in 415 items of Anchor, Gang-Channel, and Instrument - Mounting types of Elastic Stop Nuts are published in a folder available from the Elastic Stop Nut Corporation, 2330 Vauxhall Road, Union, N. J.

Industry Overcomes Many Shortages by Using Substitutes

The lack of abundant supplies of strategic materials is rapidly being overcome, the Aircraft War Production Council reports.

Substitute materials are replacing aluminum in such parts as troop benches, window frames, compartment linings and partitions, tail cones, fuselage noses, wing fillets, cabin floors, wing flaps, control surface tabs, nose wheel doors, antenna masts, air ducts, radio shelves and life raft shelves.

Douglas Aircraft Company engineers feel that plywood can be made suitable for certain parts of combat planes, such as the A-20. Lockheed has saved hundreds of pounds of rubber per plane by the shrewd use of synthetics in its P-38's. Others, like Consolidated, Vultee and Vega, are experimenting with kapok to replace rubber, decals to replace aluminum, stainless steel instead of inconel, zinc rather than cadmium.

THREE-IN-ONE Kollsman combination dual tachometer and synchronoscope for twin-engined aircraft occupies space of one standard size instrument dial. Synchronization, indicated by the rotating subdial, is quickly obtained by matching tachometer pointers with slight adjustments from the synchronoscope. Details available from the Kollsman Instrument Division, Square D Company, Elmhurst, New York.

HELP WANTED, MALE

Man wanted for position of Chief Tool Designer with large aircraft firm in the South. Must have had at least twelve years' experience in aircraft tooling of which six years should be in tool design. Write application to Dept. C, SOUTHERN FLIGHT, P. O. Box 750, Dallas, Texas, stating experience, age and salary, and enclosing personal photograph.

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HEADLINERS

Robert H. Hinckley, above, who resigned as Assistant Secretary of Commerce for air, effective July 1, has assumed duties with the Sperry Corporation as assistant to the president, Thomas A. Morgan. He was succeeded in the government post by William A. M. Burden of New York, who had been with the Defense Supplies Corporation of the RFC. President Roosevelt accepted Hinckley's resignation with regret, adding that "I am glad to know that your new work takes you into the production of vital war equipment." Hinckley had been largely responsible for the production of 105,000 CAA licensed pilots who'll do the winning at war.

Solon Says Giant Jap Subs Carry Aircraft

The spectre of enemy submarine aircraft carriers has again been raised—this time by Congressman Satterfield of Virginia, who apparently speaks with authority.

"We should not be taken by surprise when the real naval engagement is fought in Japanese waters," he said in the House, "for I am convinced that that engagement will reveal enemy giant submersible aircraft carriers."

Rep. Satterfield, a Naval reserve lieutenant commander, who has served as an observer with the American Embassy in London, said he had confirmed that Germany is supplying submarines with huge, long-range underwater freighters carrying 7,500 tons across the ocean at an average depth of 100 feet.

Stratemeyer Replaces Harmon

Maj. Gen. George E. Stratemeyer, former commandant of the Southeast Air Corps Training Center, Maxwell Field, Ala., has been assigned as chief of the air staff of the Army Air Forces.

He succeeds Maj. Gen. Millard F. Harmon, assigned to "another very important post which will not be made public at this time."

World's Fastest Navy Fighter Makes Debut

Described as much superior in speed, climb and maneuverability to the vaunted Japanese Zero, the first of the Navy's new Vought-Sikorsky Corsair fighters has made its initial flight at Stratford, Conn., marking the initiation of quantity deliveries from the United Aircraft Corporation. Powered by a 2,000-horsepower Pratt & Whitney Double Wasp, the new fighter is called the world's fastest and most powerful Navy plane.

First Inter-American Air Students Graduate

Forty young men from the other American republics have graduated from United States flying schools under sponsorship of the CAA in co-operation with five other government agencies, with the Defense Supplies Corporation financing the project.

Under the plan more than 500 scholarships have been offered to young men in the Southern republics. Two hundred will be trained as pilots, nineteen as aeronautical engineers, eighty-seven are taking the instructor mechanics course, 120 are learning to be service mechanics, and 100 will take a non-military flight instruction course given by the Army Air Forces.

200,000 Pupils Will Take Pre-flight Course

Approximately 200,000 high school seniors throughout the country will be enrolled this fall in pre-flight aeronautics courses, according to Bruce Uthus, special assistant to the Secretary of Commerce. About half of them will be girls, he said. Since the program was conceived, it has been found that aviation must also be included in elementary and secondary grades in addition to high school senior classes, Uthus said.

Eager for Landplanes, Navy Revises Entire Procurement Program

The Navy reportedly has revised its whole airplane procurement program to place emphasis on heavy and medium land-based bombers, and Secretary of War Stimson has acknowledged that the Navy's tardy drive for land planes, intensified since the victories of land-based AAF bombers over Jap forces in the Pacific threatens to reduce the number which otherwise would go to the Army.

Meanwhile, Rear Admiral John H. Towers, head of the Navy's Bureau of Aeronautics, has complained of difficulties of obtaining land planes through the War Department. About all the Navy has obtained have been a few twin-engined A-20's. The Navy wants "powerful fighting bombers" to protect shore bases and "strike heavy blows at sea." Towers has for some time advocated acquisition of land planes by the Navy, but admirals favored battleships and carriers.

American Aviation magazine says the Army's long-range program of procurement would be "dislocated by any sharp increase in Navy demands" for land planes.

Two Air-borne Divisions Organized by Army

Undersecretary of War Robert P. Patterson has announced formation of two complete air-borne divisions of 8,000 troops each, and the creation of two other unique units—the first special service force and a special transportation corps of the Services of Supply.

The special service force, which includes a contingent of Canadian troops, will be specialized in such offensive operations as parachuting, marine landing and mountain and desert fighting. It will operate directly under the Army's deputy chief of staff and will have a training base at Helena, Montana.

North American to Build B-24's In Texas

Arrangements have been completed for North American Aviation, Inc., to build four-engined Consolidated B-24 bombers at its Texas factory to join Consolidated's California and Texas plants, Ford's Willow Run factory in Michigan and Douglas Aircraft's Oklahoma plant in delivering the long-range heavy bombers in greater volume.

This was revealed late in July in an announcement by Consolidated's Texas plant of a meeting of the B-24 liaison committee. The announcement listed factories to be represented at the meeting, and included North American's Texas plant, represented at the confab by Ken Bowen, assistant factory manager.

Although the Consolidated announcement had been approved by the Army Air Forces, further details of NAA's role in B-24 production could not be obtained locally. It was assumed that production of single-engined AT-6 trainers for the U. S., Britain and other nations will continue uninterruptedly at NAA, with the new work on B-24's to be done in additional factory installations which have been under way for months.

Factory representatives of the B-24 family's "big four"—Consolidated, Ford, Douglas and North American—met on August 3 at Fort Worth at a session of the B-24 Liaison Committee to go over problems and procedure. The committee is headed by Brig. Gen. K. B. Wolfe, chief of the production section of the U. S. Army Air Forces Materiel Center, Wright Field, Ohio. Also on the committee is Major Dennis Mulligan of the AAF production section at Wright Field. Consolidated's member at the conference was George J. Newman, vice president in charge of the Fort Worth division. Other company representatives there were Harry O. Williams from Douglas and E. A. Dunton of Ford. Further details were unavailable.

VITAL TO GLOBE'S assembly of twin-engined AT-10's are William Fuller (left), factory manager, and K. H. Knox, chief engineer.

Globe Soon Will Turn Out First Beech AT-10

Globe Aircraft Company of Texas is expected soon to begin delivery of Beechcraft AT-10 twin-engine trainers, marking the start of large-scale "sub-subcontracting." Details of the big Army contract held by Globe have not been released, but when it was awarded in the spring it was announced that deliveries were expected in September.

Workmen are applying the finishing touches to a large factory building in which Globe will operate four assembly lines. Scores of subcontractors will feed major components into the plant, from which fly-away deliveries will be made.

Jim Rivers is works manager with Bill Fuller, former manager of Meacham Field at Fort Worth, as factory manager, and Lloyd Pearce as production superintendent.

Navy Begging for 100-Hour Airmen

With the expansion of the Navy's air force hitting a heretofore unknown high, the need for pilots, ferry pilots and instructors has become extremely acute. Acute to the extent that civilian pilots with as few as 100 hours in the air, in any type ship, may be eligible for commissions in the fleet air arm. Under a new system adopted by the Navy, civilian pilots with a minimum of 100 hours in the air may be eligible for commissioned posts. Age limits are 21-30, inclusive.

If successful in passing a flight examination in secondary civilian pilot training equipment, the applicant will be commissioned under a probationary set-up and sent to advanced training on inactive duty. Upon completion of this training, he will be sent to an advanced naval air base for further instruction, on active duty and with pay.

An officer's commission in class A-V(T) of the Naval Reserves follows completion of the advanced training. Officers will be designated as Naval Aviators (qualified naval flyer) and will be sent into duty with the navy in capacities for which they seem the best fitted.

Physical qualifications are similar to those for any naval flight training. Officer ability is an essential trait. Interested men should contact the Naval Aviation Cadet Selection Board, Allen Building, Dallas, Texas, immediately. The states of Texas and Oklahoma are under jurisdiction of the Dallas flight selection board.

Civilian pilots not qualified for application under this new naval set-up might possibly be qualified for flying petty officer posts under an arrangement for the enlistment of civilian pilots with average education who are between the ages of twenty-one and forty. These men may be given non-commissioned flying posts with the Navy and put on active duty with Naval Air pilots (non-commissioned pilots).

"Flying Flounder" in 62 Successful Flights

A wingless airplane dubbed the "Flying Flounder" has been successfully tested on sixty-two flights by Cheston L. Eshelman, 27-year-old of Baltimore, whose CAA license was revoked in 1939 when he was fished from the sea 175 miles from Boston and told authorities he had attempted to "fly to Mars" in a rented plane. The strange-looking plane looks like an elliptical pancake and is only twelve feet wide although it is twenty-four feet long. Its 130-h.p. engine gives it a maximum speed of 190 m.p.h, and it lands tail-wheel first.

Eshelman said he and six others built the "Flounder" of plastics in eight weeks at a cost of $5,000. He plans another, but larger. A 30 per cent reduction in drag was claimed for the craft.

Boy Scouts Launch "Air Scout" Work for Youth

The Boy Scouts of America organization has launched an Air Scout program dedicated to "peace and brotherhood—not destruction." Conceived by P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co. The program aims to teach boys from fifteen to nineteen years old aviation fundamentals leading to flight training. No actual flying will be involved. Ranks include "Observer," "Craftsman" and "Ace" and the program includes model making, testing and flying, and visits to airports, air training centers and aircraft factories.

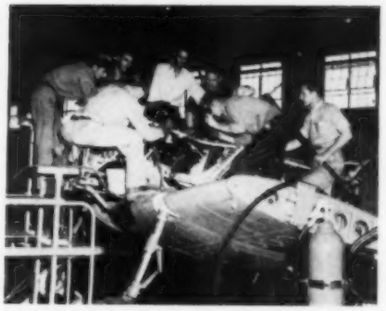
Persistent Violator Enjoined

The CAA has cracked down on Andrew D. Drumm, Jr., of Fallon, Nevada, who allegedly publicly defied inspectors, openly bragged he had flown for twenty-five years without a license and freely admitted he had not conformed to regulations. The Federal court has enjoined him from flying his own plane and suit has been instituted to recover $11,000 in fines for recent CAA violations.

CAA Officials Study Methods at Pensacola

Sixteen men from the Washington office and Regional offices of the Civil Aeronautics Administration are at the Naval Training Station at Pensacola, Fla., studying naval aviation methods and procedure. From each Region, one CAA Flight Training Supervisor and one Aeronautical Inspector from the General Inspection Division attend these "schools" where they absorb the Navy's conception of aviation training and then return to their sections to pass on the information to operators of CAA contract flight schools.

Similar "clinics" are held by the Army for CAA inspectors and flight supervisors. Two men from each of the seven Regions and two from the Washington office recently finished such a course at Randolph Field, studying Army training methods. The CAA is training 13,350 pilots for the Army and 20,000 for the Navy.



CIVILIANS REPAIR Army planes at the Enid (Oklahoma) Army Flying School. These are welding broken steel parts on a damaged trainer.

Mustang Fighters Win Praise in Strafing

The Mustang, North American's liquid-cooled engine fighter, recently came in for praise by the British after performing in low-level attacks in Occupied France conducted by the Army Co-operation Command of the RAF. The British call the Mustang "rocket-like" and use it also as a fast scout plane. In ground-strafing, the Mustang's six wing guns and twin nose-mounted weapons were credited with destroying enemy ground troops afoot and in armored vehicles. The new-type airflow wing on one Mustang was almost sliced in two when the craft struck a balloon cable, but it was nevertheless piloted back to England. In another instance, a Mustang was returned safely although one of its wings was shattered by explosive shells, which struck the ammunition boxes feeding the wing guns. The U. S. Army Air Forces also use the fighter, under the designation of P-51.

Air Ambulances Readied By Army Air Forces

An Air Evacuation Group (Medical) is being organized as a part of the Air Transport Command for the aerial transportation of sick and wounded personnel from the various theaters of war. Brig. Gen. David N. W. Grant, Air Surgeon, is setting up arrangements to assure the Group's effective use in each theatre of operations.

AT-6 Sinks Submarine

Improvisation has paid dividends to the Mexican Air Force in coast patrol work. A North American AT-6 trainer, equipped with machine guns and bombs, was reported to have sunk a German submarine for the Mexicans.

Half Enough Plywood in July, WPB Aide Says

Charles C. Lincoln, Jr., special War Production Board consultant on converting furniture industries to aircraft construction, said in a speech in Chicago that the military requirements for plywood and wood for use in aircraft are "astounding" and reported that aircraft manufacturers in July received only half as much plywood as they needed. He added that furniture factories after the war "seem sure" to remain a part of the aircraft industry.

PORTS OF CALL

Correspondence from Airports and Airways

Dallas, Texas

Local Airport for Sale

On tour with Tony—Robert Kenty of Air Associates made the West Coast this month, to visit the factory there and check up on things. He reports all is well and that the coast is second to Texas. Returning on the "A" Liner, he and George Brent (of the movies) were the only passengers not on the Ferrying Command and the boys were plenty entertaining. Jimmie McGill at Air Associates reports that business is too good, probably due to the cold snap we are having this month. It hasn't been over eighty under any large tree in Dallas (at night).

Caught George Marshall in his pilot's uniform with a flock of books under his arm. He stopped and gave the countersign (fly high, fly often) and admitted that he was working on a refresher course to get his commercial so he can get to CAPing . . . (Gosh, isn't everybody?) W. D. (Bill) Warren, formerly of Mineral Wells, Texas, has joined our midst . . . bought a Stinson from Bob Millsap and is piling up time for a Ferrying Command job . . . before he goes though he and the Stinson are going (yep, you guessed it) CAPing.

If you want a darned good airport with a pay load of students and equipment, get in touch with Bob Millsap at Hangar 10, Love Field . . . he has a mighty fine deal for the right party . . . because it looks as if he has been called to duty of a military nature. We're sorry to see him hafta go, but somebody is gonna get a good deal on that account.

Love Field is chuck full of military men and Army personnel; in fact, every noon the coffee shop looks like any Army and Navy club. Southwest Airmotive and Bob Millsap are operating the only private repair stations on the field. The others are either on contract or called to service.

George Haddaway, our editor, is off on some sort of mission for the CAP (there's that outfit again) . . . Jimmie Marshall has up and moved to Lufkin, now operating a CPT program. . . . W. W. (Bill) Walter, formerly with Associated Aviation Underwriters, has joined the Ferrying Command. . . . Frank Norris has a Cessna which he is giving the daily workout. He bought it from Jack Nelson of McAllen, and they practiced landings all one Sunday, so goes the story. . . . But right off hand it would appear that we've gone to war and instead of "Hold 'em Cowboy" it's "Give 'em Hell, Tex." . . . See ya.

TONY HAGMANN

Enlist in your CIVIL AIR PATROL

Birmingham, Alabama

Airacobra Movies Shown

The Bell Aircraft Corporation furnished a program for Birmingham Aero Club last month with a showing of a motion picture "Cannon on Wings." This picture featured the much publicized "Airacobra."

John S. Foster has gone into service in the Judge Advocate General Department. . . . E. W. Stanford has replaced Asa Rountree, who has recently gone into the service, in state aviation. We are sorry that "Stan" will make his residence in Montgomery but our best wishes go to him in his new position.

The Birmingham Aero Club reports the following new members: Wm. H. Ross, Ivy Gwin, Pevey Rosenberger, Morris E. McCain, Katherine Seigler, Mrs. Blanch Herzfeld, and George Austin.

DAN HUDSON

Enlist in your CIVIL AIR PATROL

Fort Worth, Texas

Local Firm Buys Victor Flying Service

Purchase of the Victor Flying Service, which has been operating at the Municipal Airport at Sherman, Texas, for the past several years, has been announced by Roy Taylor, president of the Southwest Aircraft Motor Supply Company. Mr. Taylor and his partner, Gene Royer, manager of Aircredit, Inc., Fort Worth, will continue to operate the flying school and co-operate with Austin College in the CPTP. Expansion of facilities is included in plans announced by Taylor. Buford Russell will remain as manager.

Three Fort Worth men have completed training at the Army Air Force technical training command school, Miami Beach, Florida, and have been commissioned. The trio are Second Lt. Ralph L. McDonald, Second Lt. Doyle C. Armstrong, and First Lt. William O. Currie.

Executive offices of Fort Worth's CAP have been opened by Chief Executive Officer D. L. Johnson in connection with his regular office, with Miss Linnie McCormick as secretary. The action will facilitate the handling of applications for prospective members. All squadron records will be maintained at headquarters, according to Paul Harmon, public relations officer.

Keeping a few jumps ahead of tire and prospective gasoline rationing problems are flyers Seth Barwise, John H. Dean, Jr., and George Wilderspin, who are sporting new motorcycles. Now going after his multi-motor rating, Mr. Dean soloed Roy Taylor's tri-motor Stinson for the first time. He owns a Luscombe, having won his private license last year.

Rising ceilings brought a rush of new fledglings to private fields, with Midway Airport accelerated with new cloud hoppers—Ira Hall, R. W. Hanson, R. G. Cox, Roy Jess Hyde, C. A. Keenan, M. W. Lockridge, Byford Sparkman and M. R. Hollister.

Sporting a new Cub at Singleton to expedite his flying time, is H. B. McMoy, who has had five hours of solo since taking over the controls for the first time recently. . . . B. M. Roberts should be ready for his flight tests soon . . . and joining the flying crowd is Miss Karen James, of Bewley Mills.

MARGARET EWING

Enlist in your CIVIL AIR PATROL

Kansas City, Missouri

Messerschmitt Aids War Stamp Drive

Air Show—When a Messerschmitt swoops over an American city and only eyes are trained on it instead of anti-aircraft guns, that is news. To assist in a War Stamp drive, Kansas Citians were privileged to see a three-day event in which eight planes took part, including the Messerschmitt, which had been shot down in England, and subsequently repaired and shipped to this country for exhibition. A highlight of

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the ceremonies was the induction of one hundred aviation recruits, including students enlisting in the civilian pilots' training course and glider pilots.

Gliders—The first Kansas Citian to hold a commercial glider pilot certificate is William Skinner, an engineer for the CAA headquartered here. . . . Increased interest in the Army Air Forces glider program has been noted and a representative group left the city to begin flight training. Radio broadcasts in which members of the aviation committee of the Chamber of Commerce took part have helped to boost knowledge of the glider program.

Visitors—Among our visitors this month was Raymond W. Young, chief engineer of the Wright Aeronautical Corporation. He spoke before a group of engineers and their guests, illustrating his lecture and also displaying the Mercedes-Benz engine which powers a Messerschmitt. . . . Merrill C. Meigs, chief of the aircraft section of the OPM, and a pilot in his own right, bowed into the city for one evening. . . . A surprise visitor was the celebrated Brig. Gen. "Jimmy" Doolittle, who unobtrusively slipped into Fairfax municipal airport in his fast plane.

Women in Aviation—A member of the Kansas City Unit of the Women's National Aeronautical Association was one of three Kansas City girls to join the exclusive officers' rank of the newly formed WAAC. Miss Doris Leeds, publicity chairman of the Unit since March, 1942, has reported for officers' training at Ft. Des Moines. In addition to her activities with the WNAA, Miss Leeds was active in the CAP, serving as unit chief of personnel for the airport group. . . . Miss Leah Shepherd, who has made rapid strides in her aeronautical career in Kansas City, has now been elevated to the position of flight supervisor for the Ong Aircraft Corporation. Besides co-ordinating the instruction program at the school, Miss Shepherd will make check flights with the students. The school is under contract with the CAA for the training of Army and Navy pilots.

Adieu—Long known as the "Father of Aviation" in Kansas City, Lou E. Holland was presented with a scroll thus officially saluting him, prior to his leaving for Washington, where he will be a deputy chairman of the War Production Board, and chairman of the Smaller Plants Corporation, recently created by an act of Congress.

MARION MELCHER

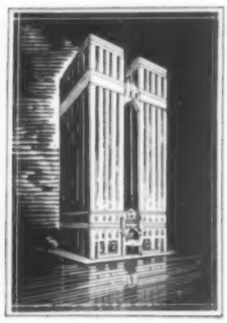
Enlist CIVIL AIR PATROL in your

Mexia, Texas

CAP Aids Defense Bond Drive

The Mexia Airport cleared eighty-three cross-country flights and one hundred thirty-four local flights during the past month.

The Fifteenth Squadron of the Texas Defense Guard has been mustered out by order of the Governor of Texas, and all officers and nearly all of the enlisted men have made application for enlistment in the Civil Air Patrol. Pending orders from the Wing Commander,



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the squadron is continuing its training program, including military drill and flight maneuvers twice weekly.

Elvin Ray Ferris, airport guard and student pilot, has made his dual cross-country to Temple and Waco, and is ready for his solo cross-country.

The local unit of the CAP recently assisted the Chamber of Commerce of Teague, Texas, in its Defense Bond drive, a five-ship formation of planes flying over head during the parade.

Mexia Flying Service, Inc., has added a Stinson to their flying equipment, and there is another new ship on the field—a Waco belonging to three instructors at Corsicana.

VANITA ROBERTS

Enlist CIVIL AIR PATROL in your

Nashville, Tennessee

CAP Aids War Bond Rally

According to Mary Louise Keim, the CAP of Nashville made their fifth request flight in a big War Bond Rally held recently at Madison. The rally was a huge success and drew some $56,000, which is a lot of green stuff in any language . . . and the CAPers did a fine job of formation flying over the parade.

The Tennessee Bureau of Aeronautics has started something which will earn cheers from feminine flyers all over the nation. Ten women who hold private licenses, or higher, will be chosen to be trained as flight instructors. This was announced by W. Percy McDonald, chairman of the bureau, and is not Irish blarney. They will have an eight-weeks' course at the Nashville Flying Service, Berry Field.

Here's the best part of the story: If the course turns out successfully, it is possible that the CAA will take gals back into the CPT courses from which they were bounced some time ago. Robert H. Hinckley, Assistant Secretary of Commerce, Aviation Department, has said: "Women have always furnished the fundamental background of teaching. If they are properly trained to instruct in aviation, they can contribute much toward releasing pilot power for active duty."

The chances for good reception of women instructors have been checked by Colonel Herbert Fox, who heads up the CPT Bureau in Tennessee. . . . It is a good bet that the eyes of all women pilots are on Tennessee. . . . and we wish them the best of luck.

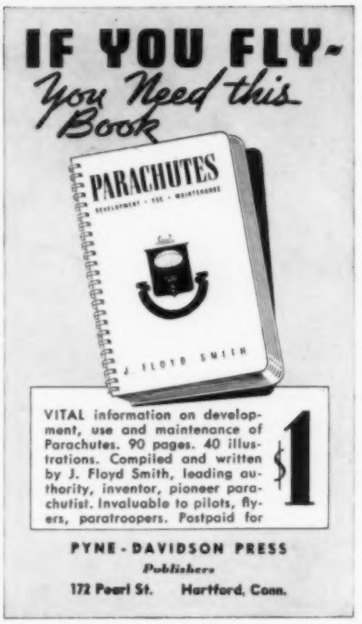
GENE SLACK

Enlist CIVIL AIR PATROL in your

Oklahoma City, Oklahoma

Successful Air Raid Maneuvers Held

The state-wide air raid warning test held last month by the Oklahoma Civil Air Patrol was a success as far as the Oklahoma City group was concerned. The mock raid was charted by Orville Hannum, group commander, David J. Perry, commanding officer, and Mont F. Highley, Jr., executive officer. It was executed by sixteen pilots, sixteen observers and four flight leaders. Each pilot took an observer on the trip over his designated route. Four of these observers were women: Mrs. C. G. Harris, Mrs. George E. Moeser, Mrs. Burt D. Sponhaltz, and Miss Mary Francis. Plane "spotters" on the ground at various points over the state filed written reports with Milt Phillips, state aircraft warning officer and chief air raid warden, giving a description, number, height, speed, time, and direction of all planes sighted.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The saddest scene reported around any airport last month was when Uncle Jimmie Brazell, seventy-four-year-old pilot, sold his ship and remarked, "I'll never own another one."

Mr. and Mrs. Cecil Davis were hosts to the Oklahoma City Aviation Club in the Variety Club's air-conditioned penthouse last month.

MRS. B. D. SPONHALTZ

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Arkansas Governor Enlists

Governor Homer M. Adkins recently enlisted in the Arkansas Wing of the Civil Air Patrol. He was among state military and civilian defense leaders who reviewed the neatly-uniformed members of the Little Rock group recently.

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The West Coast

On tour with Tony—Between sunup and sundown, on account of blackouts and "40 miles for victory" signs, one can, each day, visit only a few of the plants which are makin' the fixin's for our big fightin'-mad bombers. For example, meet *Lou Wallace* and *"Red" Spievak*—they head up a company known as *Products Engineering Company* in Los Angeles. They make jig clamps and stuff which somebody said "couldn't be done"—so they dood it. However, they are developers of new equipment and only manufacture because of necessity during this war. When it's over, they will be remembered as a company who came through in a tight. Power to you all for a fine job!

Another company, *Tubing Seal Cap Company*, located in Los Angeles, is getting a lot done in this main production company, and the head man there, *Mr. Livingston*, has been in the South—likes us 'cause we're friendly. He was a pilot in the last war; flew Curtiss boats for the Navy, up until about 1922, when he dropped his license. As soon as this thing is whipped, he'll be in the market for a nice plane. (Salesmen, please note: AFTER the war is won—much too busy now helping to win it.)

Lloyd Stearman is the plant manager for *Harvey Machine Company*, located in Los Angeles, and well known to all in aviation. They hire a large number of women who put pieces here and there and make a lot of things strongly suspected as being for our air fighters. One of the Mr. Harveys invented a Rube Goldberg gadget for electric welding which is a prime honey. Makes 'em smooth and even—believe it or not.

Plomb Tool Company has long been in the aviation tool business and is at the 100 per cent production figure today, where it will undoubtedly stay. We hangar-flew about production with *Freeman W. Kirwin* and *Glen Crandall*.

Over at *Keystone Tool & Supply Company*, Los Angeles, you will find *A. E. Smith*, president, who has been on the Aviation Committee of the Chamber of Commerce since they were both young uns. His company is very active building for a win and he, too, will be in the market for a private plane when it's won. (Salesmen, please note.) Do you remember Talliaferro Field in Texas, which was set up in the first half of this war—back in '17? Well, *Tom C. Carney* of Los Angeles was a Kelly man who wound up there. He has a soft spot in his heart for the Southwest and is still in the aviation industry.

At *Aero Industries Technical Institute*, out San Fernando Road, you may see a double shift, under the direction of another Texan, *H. B. Harms*. They are learning the mechanical and engineering side of our Air Corps. They have the Army and civvies on a wartime-learning schedule and are very interested in wood and plastics for the future.

At El Segundo, *Don Smith*, president of *Interstate Aircraft & Engineering*, gave us a look-see at his war plant which is really humming. Mr. Smith is a private pilot, too, and was pleased to know that we called his ship Inter"Stukas" in these parts. His Chief Pilot Houck pauses for a coke. Houck has been ferrying planes all over this U. S. A. and can really spin some tight ones about the "glamour" of being a Ferrying Pilot. We'd met before at Wichita Falls, where he'd brought some "Stukas" for Fulcher Armstrong, and it was nice to meet again. Out in that same district you find *AiResearch Manufacturing Company*, all painted up so nobody can drop a pin and hit it from a thousand feet. Quoting *Colin Reynolds*, who runs the advertising department (and is a mean ambulance man in his own right), there are a couple jillion peaceful-looking balloons strung around these places and at night they rise into the heavens to protect their swing shifts from our enemy. All spies please note: These places are guarded with full knowledge that some yellow-livered heels may try to harm them, and woe unto any that try. Take it from us, it's sure death.

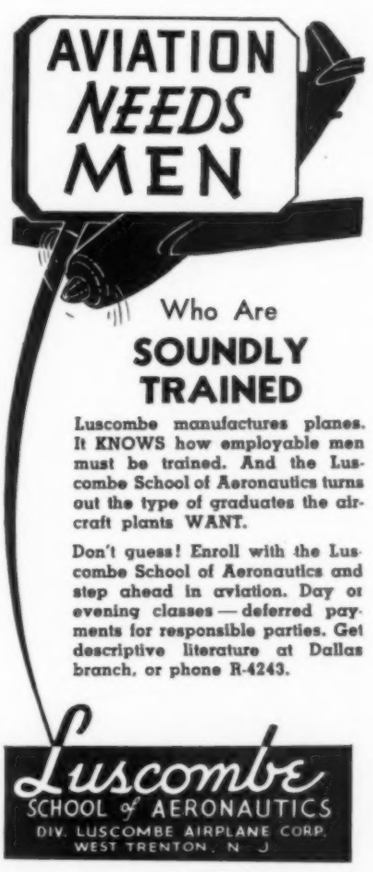
Aero Tool Company has a young man, *Lester Deutsch*, at the stick turning out "Aids to Aircraft Building," under a heavy schedule, They have plans for "after" and will be heard from in a large way if present indications are true.

Out Inglewood way is the *Universal Microphone Company*. Head man, *J. R. Fouch*, is doing 200 per cent defense work. And in charge of personnel is *Andy Meagler*, who keeps 295 people busy—most of 'em gals. When you're saying "Tower, from N. C. 1942. Go ahead tower," you're using their products.

This gives you a whipped-up version of who and whatzitz in a few plants on the West Coast, and it would be nice to tell more of the details. But no can do. However, woe to you, Hirohito! 'Bye now!

TONY HAGMANN

Enlist in your CIVIL AIR PATROL



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BIRMINGHAM "BOMBED" BY CAP PLANES

By HAYDEN BROOKS
Alabama Wing Executive Officer

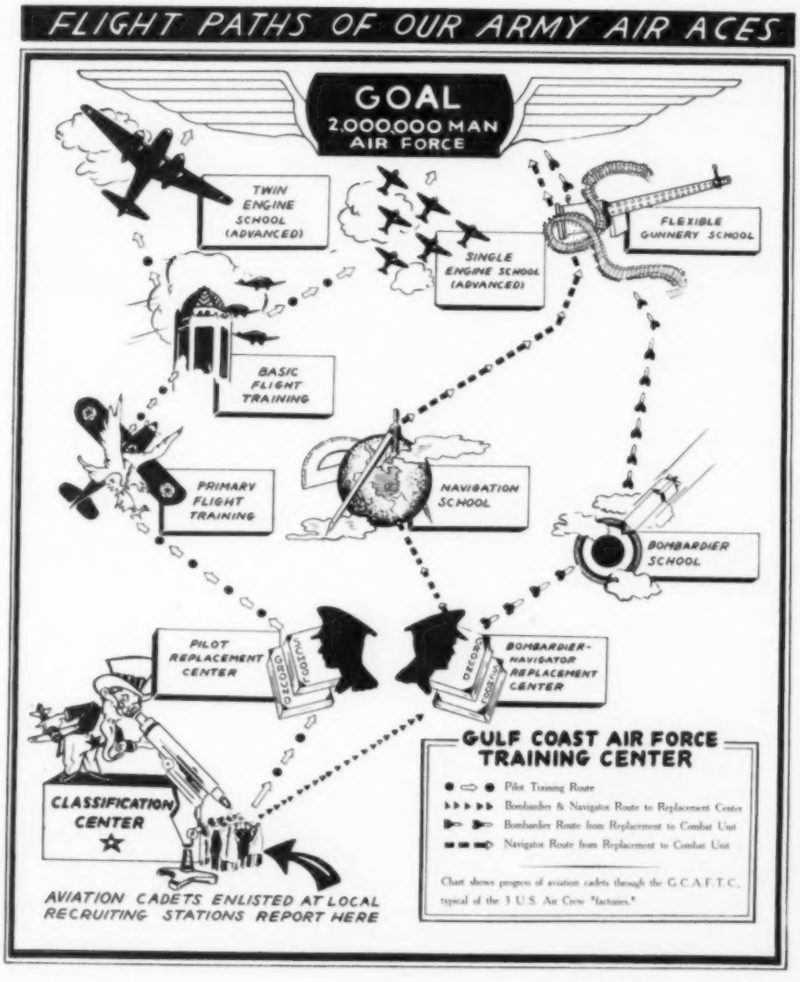
Fifty planes of the Alabama Civil Air Patrol Wing staged a realistic large-scale "bombing" of Birmingham and its environs on August 2, furnishing Jefferson County's 20,000 civilian defense workers an opportunity to rehearse their emergency duties with thoroughness.

A total of 7,500 "bombs" were dropped. They were small paper bags, each loaded with five ounces of sawdust. Colored paper streamers, one inch wide and twelve inches long, labelled the "bombs"—yellow streamers were for incendiaries and red ones for high explosives.

The various squadrons were given carefully-selected targets, together with exacting orders which were followed minutely. The planes left the Birmingham Municipal Airport at 2:15 p. m. and, to confuse the ground crews of air raid wardens, first aid attendants, auxiliary police and firemen, flew in all directions to outlying districts. Following their orders, they assembled at several rendezvous points and arrived over their targets at exactly 3:15 p. m.

Back in Birmingham, the air raid warning system gave the "yellow" signal of approaching planes at 2:45 p. m., sending civilian defense crews to their posts, as air raid spotters charted the approach of the aircraft. At 3:00 p. m. the populace heard the "blue" signal—something was about to happen. At 3:15 p. m. the first bomb was seen falling and the "red" signal was flashed—the attack was on in full scale. Sirens and whistles sounded, all ground traffic was abruptly halted and detours were made around spots where "red" high explosive "bombs" landed.

BIRMINGHAM RAID SCENES. At the top, left to right, Col. C. T. Mower, 3rd Air Support Command; Major Earle Johnson, National CAP Commander, and Hayden Brooks, Alabama Wing Executive Officer, look on as crewmen load one of fifty Civil Air Patrol planes with "bombs". At bottom are lady drill squadrons 461-1 and 461-2 just before the attack, and a view of an open-air luncheon given by Wing Commander Harold Wood in honor of Major Johnson.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AVIATION CADETS ENLISTED AT LOCAL RECRUITING STATIONS REPORT HERE
GULF COAST AIR FORCE TRAINING CENTER
Pilot Training Route
Bombardier & Navigator Route to Replacement Center
Bombardier Route from Replacement to Combat Unit
Navigator Route from Replacement to Combat Unit
Chart shows progress of aviation cadets through the G.C.A.F.T.C., typical of the 3 U.S. Air Crew "factories."

Pilots Sure of Hits

For thirty minutes the Civil Air Patrol planes circled over vital war industries, staying over the respective targets until their pilots were convinced their bombs had struck home. Then they would fly to another plant, and give it the works. At one plant, where highly-inflammable fluids are made, four incendiary "bombs" were seen to strike vital installations. "High explosives" demolished the upper two floors of a large apartment building in the downtown section, and numerous residents were removed from the structure by firemen using ladders.

Commended by Johnson

The control center on the ground reported the Fire Department handled twenty-five "incidents"; the medical service and Red Cross motor corps, twenty; transportation branch, two; public works division, ten; railroad branch, five, and utilities force, four.

Major Earle L. Johnson, national CAP commander, was on hand and praised the Alabama Wing for the success of the mock raid, said to be the most thorough rehearsal of its kind ever staged in the country. Afterward, Harold Wood, Wing Commander, was host to CAP members and civilian defense officials at a luncheon. Col. C. T. Mower of the Army's Third Air Support Command, and other Army officers inspected the planes and witnessed the raid.

Because the success of the Birmingham project demonstrated the effectiveness of such rehearsals for both CAP and other civilian defense units, Major Johnson indicated that other Wings may stage similar practice.

Flying with the

CIVIL AIR PATROL

★★★★★★★★

CAP Credited With Saving 25 Vessels

Dean Landis, director of the Office of Civilian Defense, recently told the Senate Appropriations Committee that at least twenty-five merchant vessels have been saved from being torpedoed as a result of CAP flights which caused enemy submarines to crash dive in fear. He also said about 250 survivors of sunken ships had been located by CAP pilots and rescued by military craft, and told the committee the CAP has about 4,000 planes in service nationally, with about half a million miles of the Atlantic coast being patrolled weekly.

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More Courier Service

Dr. J. O. Crawford, executive officer, has announced the Tennessee Wing plans a thirty-day experimental CAP courier service to shuttle Army officers, small parts and official papers to various Tennessee cities and bases. He asked for enough volunteers to have at least one or two on call each day.

Oklahomans Simulate Raid

The Oklahoma Wing on July 5 conducted a successful mock air raid at Oklahoma City with over 100 airplanes operating from more than thirty bases taking part, as did the Aircraft Warning System's 15,000 ground spotters. Executive Officer Keith Kahle worked out operational details and Commander Moss Patterson was profuse in his praise of the participants.

Here and There

The release of fifty carrier pigeons from CAP planes in flight featured a recent field day at Richmond, Va. Fifteen planes demonstrated aerial maneuvers. . . . Orlando (Fla.) Pilots Ted Patecell, Bon Swanson and L. W. Burton, Jr., recently spotted an Army plane which crashed in a swamp and dropped provisions to the pilot, later directing his rescue. . . . Miles Scull, public relations officer, says the Arkansas Wing now has five groups of sixteen squadrons with a total of 800 members. . . . James Coburn, leader of a flying club having 700 Brewster Aeronautical Corporation employes as members, says his pilots service with the CAP are providing rapid delivery of vital parts and materials between Brewster's plants in New York, New Jersey and Pennsylvania.

CAB Bulletin No. 25 Made Weather Text

Civil Aeronautics Bulletin No. 25, being "Meteorology for Pilots", has been adopted as the Civil Air Patrol text for instruction in meteorology.

All pilots and observers of the CAP are required to take the course and no student shall be considered as having completed the course until he has obtained a practical knowledge of meteorology as covered by the text and has a thorough grounding in use of teletype and weather map symbols, recognition of cloud forms and knowledge of the weather usually accompanying them, changes in wind velocity and direction with altitude, kind of weather accompanying different air masses and fronts, location of different kinds of weather in cyclones, and elements in forecasting.

The Civil Air Patrol unit at Cessna Aircraft Company, Wichita, Kansas, is one of few in United States having insignia for its planes patterned after some of Walt Disney's creations for various units of military air forces. Design, Indian in full headdress astride soaring grasshopper whose wings bear CAP emblem, was brain-child of Nat Hull, Cessna employed cartoonist. Civil Air Patrol craft are available at all times for emergency use in transporting material, parts or personnel to avoid production delays in Wichita's defense plants.

Flying Parsons Needed

Ministers of the Gospel of any creed who hold active CAA private licenses or higher, or who have been licensed pilots in the last five or six years, are urgently needed for duty with the armed forces as commissioned officers in the Air Forces. Wing commanders of the CAP have been asked to aid in finding ministers for duty.

Hourly Pay Rates for CAP Planes on Coastal Patrol

Hourly rates paid by the government for the use of aircraft on duty at Civil Air Patrol coastal patrol bases range from $9.69 for 80-120 H. P. craft to $41.00 for 400-445 H. P. The official CAP schedule of hourly pay, showing the breakdown, follows:

H. P. Range	Operation and Maintenance	Depreciation	Crash Insurance	Accident Insurance	Total
80-120	$ 4.44	$ 2.50	$ 2.25	$ .50	$ 9.69
125-165	6.40	5.00	2.75	.50	14.65
175-200	7.32	5.00	3.25	.50	16.07
225-245	9.40	5.00	4.00	.50	18.90
250-295	10.60	6.25	5.00	.50	22.35
300-345	12.50	7.50	7.50	.50	28.00
350-395	15.30	8.75	9.00	.50	33.55
400-445	20.00	10.00	10.50	.50	41.00

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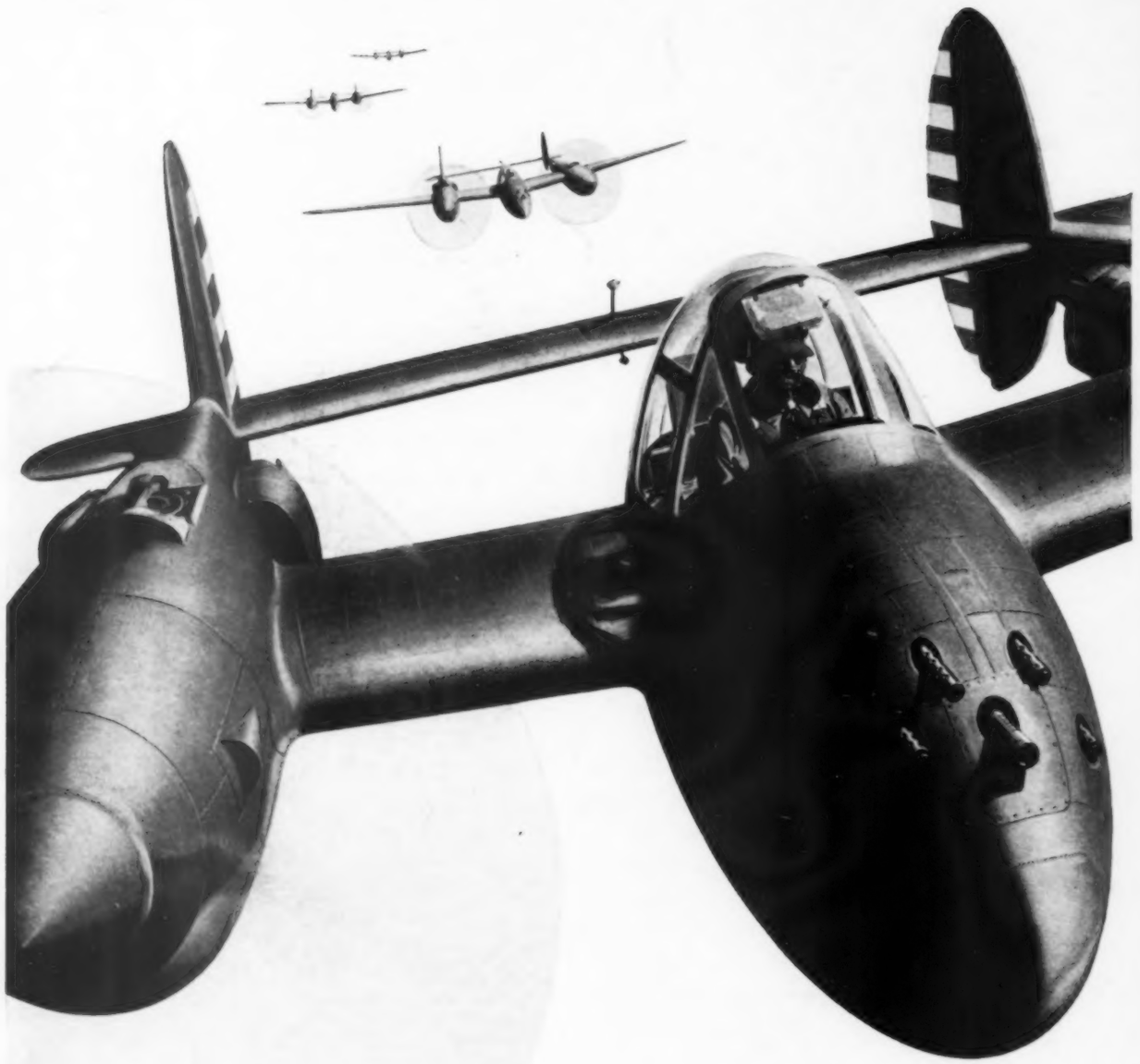

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